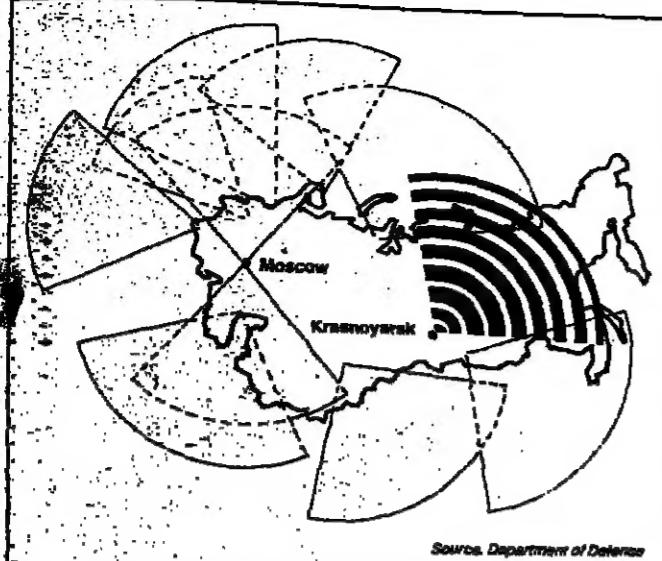


Gorbachev Still Sees SDI Gap
Soviet Leader's TV Report Hints at Doubts on U.S. Stance



The New York Times

Unlike other Soviet radar systems shown on this map, the radar being built near Krasnoyarsk is far from any borders, and does not point outward as the ABM Treaty requires.

U.S. Says ABM Extension Depends on Soviet Radar

By Walter Pincus

Washington Post Service

WASHINGTON — The United States is demanding that the giant Soviet early-warning radar being constructed near Krasnoyarsk in central Siberia be modified or torn down before any new understanding is reached on the 1972 anti-ballistic missile treaty, according to American sources.

U.S. arms control delegates at the summit meeting last week made it clear, Reagan administration sources said, that there would have to be action on the radar before agreement could be reached to continue observing the ABM treaty for seven to 10 years, as Moscow wants. President Ronald Reagan has labeled Krasnoyarsk a clear violation of the treaty.

In a television interview Sunday, Mr. Reagan's national security adviser, Lieutenant General Col. Robert E. Powell, said, "Our position is that Krasnoyarsk must come down."

Kiosk

Bomb Suspect Flown to Seoul
MANAMA, Bahrain (UPI) — A woman suspected of helping to blow up a Korean Air jet with 115 people aboard was being flown from Bahrain to Seoul on Monday, witnesses said.

The Korean authorities say the woman, who was using a false Japanese passport, is a North Korean agent. An alleged accomplice committed suicide shortly after the airliner disappeared and apparently plunged into the Andaman Sea off Burma on Nov. 29.

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FOR MORE
CLASSIFIED

"The Soviets are reflecting on it," he added.

One Soviet official said privately last week that he believed the destruction of Krasnoyarsk would be a dramatic gesture of the new U.S.-Soviet relationship. American technical experts added that they believed a satellite system could replace Krasnoyarsk's early-warning capability within several years.

Even some Soviet officials admit privately that the radar complex violates the ABM pact.

Some Soviet critics of the newly signed treaty on intermediate-range nuclear forces, or INF, have talked of amending the agreement during the ratification process to require that Krasnoyarsk be destroyed before the pact takes effect, congressional sources said.

Meanwhile, other Soviet officials, including some in the military, have described how in the early 1970s the Soviet Defense Ministry decided to go ahead with the facility knowing that it violated the provisions of the ABM treaty.

"The blame is being placed on Dmitry Ustinov," the former Soviet defense minister who died in December 1984, one U.S. expert said.

Under the ABM accord, so-called phased-array radars that were to be used for early warning of a missile attack could be placed along the periphery of the United States and the Soviet Union. They were to look outward, so that they

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Panamanian Seeks Soviets As New Ally
By Stephen Engelberg
New York Times Service

WASHINGTON — With his support among U.S. officials eroded, General Manuel Antonio Noriega, Panama's military leader, has begun more openly courting the Soviet Union, the Salvadoran guerrillas and others hostile to the United States, according to Reagan administration officials and a Nicaraguan defector.

In a major change of policy, officials said that in recent weeks a consensus had emerged at the Pentagon, the Central Intelligence Agency and the State Department that, in the words of one official, "this guy should go tomorrow."

But they said there appeared to be few opportunities for the U.S. government to exert pressure on the general, who has maintained his hold on power, they assert, by playing off enemies in the region against each other.

In the past two weeks, in the face of continuing pressure from Panama's internal opposition, General Noriega has appeared to send a message to Washington. His country has granted the Soviet airline Aeroflot landing rights and is allowing Soviet ships to use drydock sites in the country, two concessions Moscow has long sought.

In addition, he sent a diplomat to meet with the Libyan leader, Colonel Muammar Gadhafi, who replied with an offer of financial support, according to an administration official.

The disclosures come as the Senate moved over the weekend to cut off all aid to Panama and as a Senate staff study, obtained by The New York Times, concluded that the U.S. government should cut off any active or passive support for General Noriega.

Some of the most striking information about General Noriega, however, has come in recent weeks from Major Roger Miranda Benítez, a former top aide to Humberto Ortega Saavedra, the Nicaraguan defense minister.

Administration officials said

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By Gary Lee
Washington Post Service
MOSCOW — Mikhail S. Gorbachev indicated Monday that important differences remained between him and President Ronald Reagan over the Strategic Defense Initiative following their meeting in Washington last week.

In a nationally televised report to the Soviet people on his meeting

President Reagan reaffirmed its U.S. commitment to its NATO allies. Page 6.

with Mr. Reagan, Mr. Gorbachev called on both sides to maintain the "new atmosphere" in U.S.-Soviet relations resulting from the summit talks and urged the U.S. Senate to ratify the treaty to eliminate intermediate-range nuclear forces that was signed in Washington last Tuesday.

Mr. Gorbachev hinted that members of the Kremlin leadership were not fully convinced by Mr. Reagan's stance during the summit talks. He said that the delegation carefully analyzed whether there were changes in the Reagan administration's approach to the Soviet Union during the talks.

Saying the question was "not easy to comprehend," Mr. Gorbachev continued, "I should tell you, it is so far early to speak about a drastic turn in our relations."

"Nevertheless," he said, "I want to say that the dialogue with the president and other political figures of the United States was different from before. It was more constructive."

In contrast to the freewheeling, open appearances he made in Washington last week, Mr. Gorbachev was measured in his remarks, often pausing to look down at his prepared text.

Mr. Gorbachev also used the 20-minute address to warn against jumping to conclusions that Mr. Reagan's plans for a shield against space-based weapons can now proceed.

"Certain persons even try to assert that the talks in Washington have removed differences on such a problem as SDI and under that pretext make calls for speeding up work on that program," the Soviet leader said.

"I must say outright that these are dangerous tendencies and that they should not be underestimated," he said, adding that they can "undermine the nascent turn" in disarray.

In his address, Mr. Gorbachev stressed that Soviet approval of a treaty under negotiation between the two sides to cut strategic weapons by 50 percent was conditioned on a U.S. agreement to adhere to the 1972 Anti-Ballistic Missile Treaty.

The blame is being placed on Dmitry Ustinov, the former Soviet defense minister who died in December 1984, one U.S. expert said.

Under the ABM accord, so-called phased-array radars that were to be used for early warning of a missile attack could be placed along the periphery of the United States and the Soviet Union. They were to look outward, so that they

See RADAR, Page 6



Israeli-Palestinian Clashes Continue in Gaza

Israeli soldiers detained a Palestinian in the Gaza town of Khan Yunis on Monday. Witnesses said the man was later found

unconscious in an alley. Two Palestinians also died on the sixth straight day of violent demonstrations in the territory. Page 2.

Korea Reporters Protest Vote Coverage

By Fred Hiatt
Washington Post Service

SEOUL — More than 30 reporters employed by the South Korean government-owned television network held a sit-in Monday to protest against what they called biased news coverage of the presidential election.

Although opposition politicians have complained repeatedly about pro-government bias in Korea Broadcasting System news reports, the action represented the first complaints from within the network. The protest seemed likely to lead credibility to opposition charges of ruling party manipulation of the news media.

The protest also focused attention on growing tensions arising from broader accusations that the ruling party is conducting an unfair

and fraudulent campaign on behalf of its candidate, Roh Tae Woo.

Opposition candidates have warned that a popular uprising may ensue if Mr. Roh is declared the winner after Wednesday's election.

A government spokesman signified in an interview that the regime is prepared to take a hard line against any resistance to Mr. Roh's election.

"That will be the job of the government," spokesman Park Shin Il said. "It might take maximum police power — people are thinking of all kinds of contingencies. It would have to be done very professionally and very carefully."

Construction Minister Lee Kyu Hyo fueled opposition fears of a post-election crackdown when he said that violent government opponents should be "swept away" after the election. The comment, briefly reported in the newspaper Dong-A Ilbo, touched off such a wave of rumors and accusations within the opposition camp that Mr. Roh let it be known he was "disgusted" by the minister's remark.

The minister offered his resignation.

The minister offered his resignation, and President Chun Doo Hwan, acting with unusual speed, accepted it and named a replacement.

Foreigners from at least five different organizations have arrived in Seoul to monitor the fairness of the election, although the government has said it will not permit foreign observers to witness actual voting.

Several representatives of the groups said they hope to play a role similar to that of poll watchers in the Philippines, whose reports of

widespread ballot tampering helped dethrone former President Ferdinand E. Marcos. Unlike during the Philippine election, however, no U.S. senators or members of Congress have arrived to watch the minister's remark.

Opposition parties have focused not only on election day, but on what they say is an unfair campaign. A chief complaint has been that Korean television stations, all of which are owned directly or indirectly by the government, have done everything they can to make Mr. Roh look good while slighting opposition candidates Kim Young Sam and Kim Dae Jung.

The television reporters supported that contention when they held their sit-in. The reporters said they

See KOREA, Page 6

The End of the Second Jazz Age

Youth and Wealth Were Idols of '80s Investment Craze

By William Glaberson
New York Times Service

NEW YORK — When the closing bell rang on Oct. 19, at the end of the worst day in the history of the New York Stock Exchange, a characteristically American era came to an end.

It was a time when 29-year-olds were earning six-figure salaries on Wall Street. Multibillion-dollar companies were bought and sold like used cars. Everybody was "doing deals." And stocks seemed to go only up.

Eight weeks after the collapse, people are beginning to see that the five-year bull market of the '80s was a new Gatsby age, complete with the materialism and euphoric excesses of all special eras. Like the Jazz Age of F. Scott Fitzgerald's fictional Jay Gatsby in the 1920s, the years combined the romance of wealth and youth with the slightly sinister aura of secret understandings and cut corners.

"People will be looking for a point when perceptions changed," said John R. Petty, chairman of Marine Midland Banks Inc., who was an assistant secretary of the Treasury in the Nixon and Johnson administrations. "They'll pick Oct. 19. It will be the 'ever upward and onward' being replaced by tough slogging and 'one foot in front of another.'

"It's the nearest thing to a meltdown that I ever want to see," John P. Phelan Jr., chairman of the New York Stock Exchange, observed at the close of trading on Black Monday.

It is clear that the collapse will change the money business profoundly. The crisis has already led to these developments:

singer Jr. said that "in a symbolic sense," the collapse "crystallized people's discontent with the unbribed pursuit of self-interest." As they did in the Jazz Age, Mr. Schlesinger said, Americans in the '80s had tipped the balance they are always adjusting between altruism and selfishness. Self-interest won.

The financial world was the

"It will be seen as the end of a period of good, wild times and a return to reality."

— John Brooks, author

• A reappraisal of the country's market system.

• Assertions that new technology is increasing investment risks more than anyone realized.

• Concerns about the interrelationship of global securities markets.

• A sharp debate over a regulatory structure that some say lags far behind the world it was designed to control.

It will be years before the United States can measure the full impact of that dizzying day and the days that followed, but some accounting can be made now.

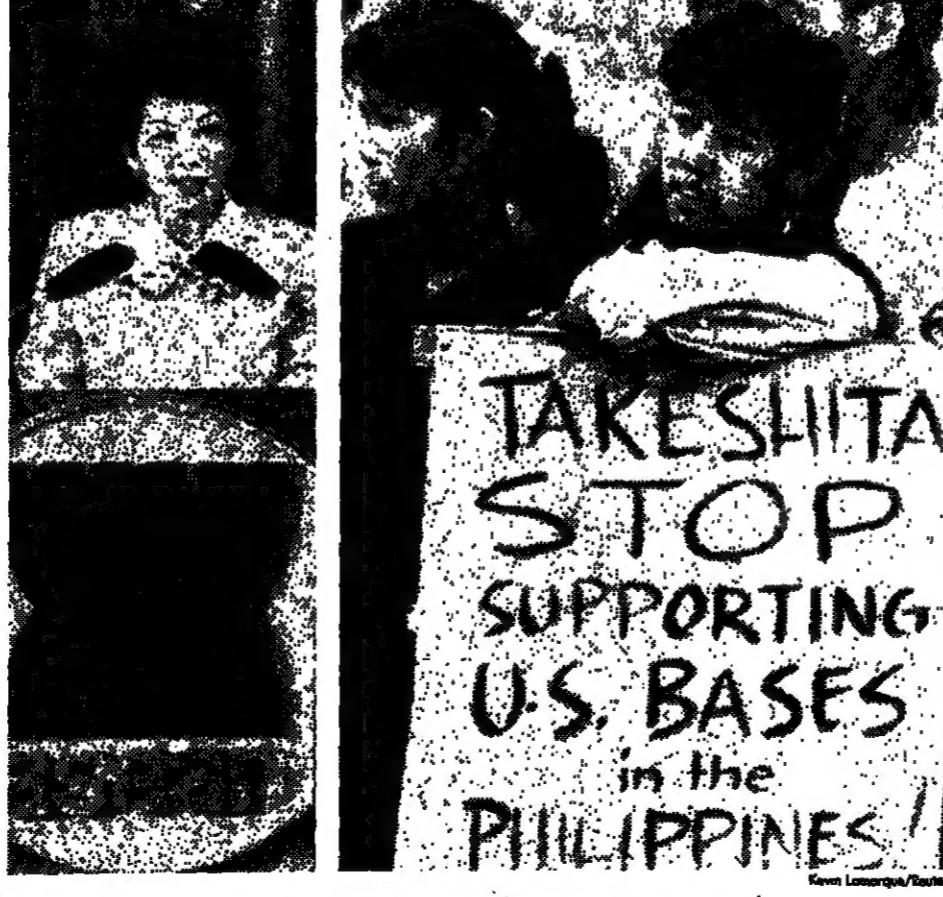
"It will be seen as the end of a period of good, wild times and a return to reality," said John Brooks, an author who has chronicled the financial world for 30 years.

On Wall Street, where the big salaries turned newly minted business school graduates into movers and shakers, the world is suddenly an unforgiving place. Securities firms have let 4,000 people go, and many more pink slips are likely to follow. This week, E.F. Hutton Group is expected to begin the first of 5,000 dismissals as a result of its planned merger with Shearson Lehman Brothers.

The stock market's rise, as it often has in the past, mirrored and shaped the American mood. Takeover fever spurred the rise and built vast new fortunes. Traders with inside tips made millions in the kinds of illicit schemes that historians say are classic marks of speculative periods.

If there were big problems like the U.S. trade and budget deficits that threatened the prosperity, they seemed distant. The market and the country, in a sense, broke away from the mundane economic details that usually govern their progress. And in all the noise, critics who said that fundamental problems threatened the country's future could hardly make their warnings heard.

"We've been through quite a few years in which we felt we had reached the millennium, which was high rewards and no risk," said Peter G. Peterson, an investment See ERA, Page 6



Protests Mark ASEAN Summit Meeting in Manila

While President Corazon C. Aquino of the Philippines welcomed ASEAN leaders to their first summit meeting since 1977, about 1,500 protesters marched in Manila on Monday to proclaim opposition to U.S. bases and to alleged U.S.-Japanese domination of Southeast Asia. The six ASEAN heads discussed the Vietnamese occupation of Cambodia and Indochinese refugees. Page 6.

By Francis X. Clines
New York Times Service

DUBLIN — First of all, the cow imported last year from the ever-receding farmlands is doing well at the zoo — herself a celebration of the progress of this tough and friendly city. For now the sight of such a pastoral creature being milked has been offered to urban Dubliners as an exotic treat.

Second, and no less important for many lovers of this city, the plan for a grand motorway to spill down through the city bold as the ancient patriots of Brian Boru has been suddenly defeated by ordinary Dubliners, who rose up in outrage in defense of the old neighborhoods.

Having gained one cow and lost one motorway, Dublin can now let the celebration of its grand millennium begin.

The new year will mark 10 centuries, by the publicists' reckoning, since the city finally fell into certifiable Irish hands, warrior king hands that wrested it from the long dominance of roving Viking occupiers in 988.

By the reckoning of some scholars, however, this is inexact by any number of years.

As a result, the only recourse for the true Dubliner is to smile in sheer Irish pleasure at indulging in one and the same cause a heated dispute and a yearlong street party to be crammed with pub songs, Thoroughbred horses, literary characters, and a spirit of forgiveness toward past conquerors — the Vikings more than the English.

"What difference does it make whether or not it's real?" asked David Norris, a Joyce scholar quite mindful that the

truth of Dublin is rooted at least as much in imagination as in reality. "It's a damn good thing that people in this city finally want to feel good about themselves and celebrate."

He is right, as the lord mayor, Bertie Ahern, concedes in proclaiming "yet another comeback" for a doughty city where "being optimistic and hopeful is not fashionable."

The cycle of hard times and flinty spirits has left an agreeable taste.

"Dublin Be Proud," advises the centennial book of Pat Liddy, a gifted artist who sketches and appraises, often mournfully, each corner of the city. The millennium already seems special because its boosterism is as soft to the ear as the River Liffey that flows beneath the O'Connell Street

See DUBLIN, Page 6

Presidential Race: Coming to Terms With the Treaty

By E.J. Dionne Jr.
New York Times Service

WASHINGTON — For months, the 1988 presidential campaign has moved forward almost independent of the actions of government. Although the candidates would often mention the budget deficit or the Iran controversy, they were largely free to define themselves and their images as if decisions made by the president and Congress had nothing to do with them.

The treaty on intermediate nuclear forces signed last week by President Ronald Reagan and the Soviet leader, Mikhail S. Gorbachev, has changed that. And the presidential candidates are already scrambling to adjust to the new political world Mr. Reagan and Mr. Gorbachev have created.

The new concern with Soviet-American relations will remain central to the campaign, whatever other issues arise. The next steps of the arms control process will coincide with key moments in the presidential contest.

The candidate most eagerly adjusting to the climate is Vice President George Bush, who has enthusiastically embraced the treaty and would like nothing more than to turn his campaign into a referendum on Mr. Reagan's disarmament initiatives.

Mr. Bush's leading opponent for the Republican presidential nomination, Senator

Bob Dole of Kansas, has reserved public judgment on the treaty and the other four Republican candidates have criticized it.

For the time being, Democrats have supported Mr. Reagan's initiative and have enjoyed railing against what they call the Republican "radical right" for its opposition to the treaty. But Mr. Reagan has presented the Democrats with twin risks.

On the one hand, if they continue simply to support the president, said a Republican poll-taker, Linda Di Vell, their campaign message will amount to a faint "me, too." And Thomas E. Mann, director of governmental studies at the Brookings Institution, said, "Once again, Reagan is setting the agenda and the Democrats are having to go along with it."

But if some of the Democrats try to differentiate themselves from Mr. Reagan by urging quicker action on arms control, they face the danger of appearing to be doing Mr. Gorbachev's negotiating for him.

Representative Newt Gingrich, Republican of Georgia, said his party was eager to cast the issue in terms of the question, "Does Gorbachev come to the table because America is as weak as Paul Simon or Michael Dukakis want it to be?"

Already, several Democrats are trying to cover that flank. In a speech on Friday, for example, Mr. Dukakis, the governor of Massachusetts, spoke of the need to reduce Sovi-

et advantages over the Western allies in Europe. He said the next president needed to be "tough" as well as "confident" in dealing with Mr. Gorbachev.

What is striking is the extent to which Mr. Reagan has staked out the broad middle ground toward which all politicians are now scrambling.

"They're looking toward a center position," said Senator Bill Bradley, Democrat of New Jersey, "which ironically, is occupied by Ronald Reagan."

Mr. Reagan's stance has such appeal that even some Republican critics of the treaty are softening their positions.

Representative Jack F. Kemp of New York, a Republican candidate for president, has expressed grave doubts about the accord. But he conceded that the treaty was "likely to be ratified." Its critics, he said, would have to concentrate on seeking to add reservations to the document about human rights and Afghanistan, and on influencing the next round of disarmament talks.

Mr. Kemp, like other conservatives, finds in disconcerting that Mr. Reagan's new stance is, at least temporarily, being embraced by advocates of disarmament whom Republicans only a few months ago would have dismissed as dangerously leftist. He noted that someone as liberal as George S. McGovern, a former Democratic senator from South Dakota, had been effusive in

praising Mr. Reagan. "I just about choked," Mr. Kemp said.

It is clear, however, that for all of the Republicans, the more attention focused on arms control and foreign policy the better, since the shaky state of the nation's economy has already sharply dented Mr. Reagan's popularity and that of his party.

The very timing of the next steps in the arms control process guarantee that it will never be far from center stage for much of the 1988 campaign.

The Senate vote on ratifying the arms treaty is expected to come next March or April, in the middle of the primaries. Mr. Reagan hopes to go to Moscow in late spring or early summer, close to the time of the national conventions.

The nature of the congressional debate, Mr. Mann said, could well depend on how Mr. Dole, the Senate minority leader, is faring in his contest for the Republican presidential nomination.

If Mr. Dole fails to wrap up the nomination in the early primaries, Mr. Mann said, he might be tempted to move sharply right on arms issues in the hopes of salvaging his candidacy with the support of ardent conservatives. This could severely complicate Senate action on the treaty and the future course of Mr. Reagan's negotiations with Moscow, Mr. Mann said.

France Flies Exiled Agent Back Home; Lange Angry

By Joseph Fitchett
International Herald Tribune

PARIS — Major Alain Mafart, convicted in the sinking of the Rainbow Warrior in 1985, was flown to France for medical treatment Monday despite protests from New Zealand that France was breaking a promise to confine Mr. Mafart to an atoll in French Polynesia until 1989.

France said that Major Mafart was being evacuated to receive treatment for a stomach ailment. New Zealand said that it had not been allowed to examine him.

The exchanges were reminiscent

of acrimony that strained relations between the two countries when Major Mafart and a woman agent were caught after sinking the Rainbow Warrior in Auckland harbor.

The vessel, flagship of the environmental group Greenpeace, was preparing to protest French nuclear tests in the Pacific. A photographer was killed in the incident.

Major Mafart's departure, Prime Minister David Lange of New Zealand said Monday, was a "blatant and outrageous breach" of a bilateral accord under UN auspices in which Major Mafart and Captain Dominique Prieur avoided serving 10-year prison sentences in New Zealand by being held at Hao atoll. France also paid \$7 million in reparations.

Mr. Lange said he would protest to the United Nations. Prime Minister Jacques Chirac, whose government worked out the agreement with New Zealand, dismissed Mr. Lange's complaints. He said Monday, "It was agreed that if one of them is a woman and is married, becomes pregnant, there would be an automatic return to France."

The two agents have been visited by family members during the exile on the atoll and by Mr. Chirac. Ministers in his government have blamed the operation and its diplomatically damaging failure on the Socialist government that fell in early 1986.

Charles Hernu, who resigned as defense minister in the Socialist government over the affair, conceded in a book published last week in Paris that the sabotage resulted from his "preventive orders that were badly managed."

Press investigations, which helped bring down Mr. Hernu, uncovered few additional details about who ordered the operation and why it backfired. All the French officers and intelligence operatives implicated in the operation, its attempted cover-up and the subsequent overhaul of the French overseas intelligence service, have been retired or transferred.

The Greenpeace operation, which had little domestic political fallout, fueled anti-nuclear and anti-French sentiments in New Zealand, Australia and other countries in the region.

Mr. Lange said that he learned Saturday that France wanted to fly Major Mafart home for medical tests. Mr. Lange proposed flying a New Zealand doctor to Hao to check Mr. Mafart's condition.

France said the next day that foreign military aircraft were forbidden to land on the atoll, and early Monday the New Zealand government was informed that Major Mafart had left Hao aboard a French military plane.

French officials said that a New Zealand doctor from London would be allowed to examine Mr. Mafart in Paris.

Meanwhile, the Greenpeace office in Paris announced Monday that it would close temporarily for lack of funds. Coincidentally, the hulk of the Rainbow Warrior was scuttled this weekend to become part of an artificial reef off the coast of New Zealand.

WORLD BRIEFS

2 Punjabi Police Officers Are Slain

CHANDIGARH, India (AP) — Suspected Sikh terrorists shot to death two senior police officers Monday in Punjab state while the two officers were jogging, the police said.

Two gunmen fired automatic rifles at A.S. Brar, police chief of Patiala district, and his deputy, K.P.S. Gill, at the National Institute of Sports in the city of Patiala, a Punjab state police spokesman, Singra Singh, said. Patiala, about 35 miles (55 kilometers) southwest of Chandigarh, the Punjab capital. Sikh militants had announced that the two officers were on a list of officials to be killed.

2 Die in Kenya-Uganda Border Clash

NAIROBI (AP) — Kenyan policemen and Ugandan soldiers exchanged gunfire for several hours Monday in fighting that a Kenyan official said began when 60 Ugandan troops crossed the border.

Two soldiers of the Ugandan National Resistance Army were killed and several were injured, said Bethuel Kiplagat, the Kenyan secretary for foreign affairs. He said there were no Kenyan casualties. The skirmish occurred near the main Kenya-Uganda border crossing point at Bissa.

Mr. Kiplagat said the Ugandans brought in two truckloads of reinforcements and used two tanks to shell the Kenyan forces before the shooting ended. There was no official comment from Kampala, the Ugandan capital.

South Africa Tightens Curb on Dissent

JOHANNESBURG (W.P.) — South Africa tightened its clampdown on organized dissent Monday, banning a mass rally planned in Cape Town on Monday night to protest restrictions placed on the chairman of the African National Congress, Govan Mbeki.

Mr. Mbeki, 71, who was freed Nov. 5 after serving 23 years of a life sentence for sabotage and treason, was to have addressed a rally Sunday in Cape Town, but on Friday he was ordered not to leave his home town of Port Elizabeth without permission or to give interviews or write for any publication.

An earlier rally planned in Port Elizabeth for Nov. 28 had been banned. The police commissioner in the western Cape Province said he prohibited Monday night's rally "for the purpose of public safety" and the "maintenance of public order."

Whitelaw in Hospital After Collapsing

LONDON (Reuters) — Lord Whitelaw, the deputy prime minister of Britain, was hospitalized Monday after collapsing at Parliament's traditional Christmas carol service.

Witnesses said Lord Whitelaw, 69, who is leader of the House of Lords, had finished a reading at the service in St. Margaret's Church near the House of Parliament when he slumped over in his pew.

An ambulance took him to Westminster Hospital, where he was listed in stable condition. Lord Whitelaw was home secretary from 1979 to 1983 and minister for Northern Ireland from 1972 to 1973.

Govan Mbeki

For the Record

Andrey Girod of France, left, and George Younger of Britain said Monday that they were making progress on joint development of an air-launched nuclear missile.



Reagan Picks a General For Arms Control Post

By Michael R. Gordon
New York Times Service

WASHINGTON — After months of searching for a new director for the Arms Control and Disarmament Agency, President Ronald Reagan has decided to nominate an army major general who helped negotiate the treaty banning medium- and shorter-range missiles.

General William Burns is Mr. Reagan's choice to succeed Kenneth L. Adelman, Reagan administration officials disclosed Sunday. Mr. Adelman, who announced his resignation this summer, officially left his post Saturday.

The selection of General Burns confirms that the administration's team of ranking arms control officials will have a decidedly pragmatic cast as the United States and the Soviet Union try to reach agreement on a treaty reducing long-range arms during Mr. Reagan's final year in office.

Mr. Burns, who will retire from the military to assume the new post, was described by administration officials as a nonideological military officer with considerable experience on arms control issues.

He is well regarded by U.S. arms negotiators.

The decision to appoint him follows the resignation of Caspar W. Weinberger as defense secretary and the appointment of Frank C. Carlucci, who is viewed as more flexible on arms control. In addition, Mr. Weinberger's aides on arms control, Richard N. Perle and Frank J. Gaffney Jr., also have left the administration.

By law, the director of the arms control agency is the top adviser to the president and the secretary of state on arms control issues. In practice, others have usually had more influence.

The appointment is subject to confirmation by the Senate.

The search for a director for the arms control agency began after Mr. Adelman announced July 30 that he intended to leave office after the summit meeting then tentatively expected in the fall.

A short list of candidates was drawn up. It included Paul H. Nitze, the arms control adviser to Secretary of State George P. Shultz; Edward L. Rowny, conservative adviser to Mr. Reagan, and Ronald F. Lehman 2d, the senior negotiator on long-range arms.

Mr. Shultz pressed for the appointment of Mr. Nitze, but Mr. Weinberger and other conservatives strongly opposed the candidate, who has favored negotiating with the Russians on the scope of testing for an anti-missile defense system, formally known as the Strategic Defense Initiative.

General Rowny, who is retired from the army, was regarded as too conservative by State Department officials.

For a while, Mr. Lehman was

Shultz Praises Oslo's COCOM Action And Says He Now Opposes Sanctions

By John M. Goshko
Washington Post Service

OSLO — Secretary of State George P. Shultz said Monday that the administration opposes congressional sanctions against Norway for selling sensitive technology to the Soviet Union because the Norwegian government has acted "very decisively" to prevent future incidents.

Mr. Shultz was referring to the scandal earlier this year over the activities of Toshiba Machine Co. in Japan and the state-owned Norwegian arms company Kongsberg Vapenfabrik. They sold computerized milling equipment enabling the Soviets to manufacture submarine propellers so quiet that U.S. forces have difficulty detecting them.

The sales, which began in 1974, violated the rules established by the Western alliance's Coordinating Committee for Export Control, or COCOM, against the sale of strategic sensitive equipment to Warsaw Pact nations.

The U.S. Congress is considering several bills that would punish offending companies by barring them from selling to the U.S. market.

Norway fears that a ban would bankrupt Kongsberg because it depends heavily on sales of its Penguin anti-ship missile to the Pentagon.

At a news conference here, Mr. Shultz, who is visiting several allied capitals after reporting to officials of the North Atlantic Treaty Organization at the Washington summit meeting, indicated the administration's satisfaction with Norway's remedial actions.

The prime minister described what they have done and provided

assurances of their determination to adhere to COCOM rules, he said, referring to Prime Minister Gro Harlem Brundtland. "The situation is totally satisfactory, from my point of view," he added. "Sanctions would be very unhelpful and uncalled for," he said later.

His answer indicated that the administration has accepted Norway's explanations that the sales were contrary to official policy and arranged by Kongsberg officials without authorization.

Several Kongsberg executives have been charged with breaches of Norwegian security and export laws, and the government is reorganizing its bureaus responsible for safeguarding the export of restricted technology.

Mr. Shultz also gave a pointed scolding to the European anti-nuclear peace movement, which is particularly strong in Norway and Denmark, which he visited before coming to Oslo.

That happened when he was asked if pressures from the peace movement had made possible the

scandal that began with the peace movement.

Then he added: "I would hope that the people in the movement would take a second look and admit that they were wrong. In order to have peace, you have to show some strength."

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His answer indicated that the administration has accepted Norway's explanations that the sales were contrary to official policy and arranged by Kongsberg officials without authorization.

Several Kongsberg executives have been charged with breaches of Norwegian security and export laws, and the government is reorganizing its bureaus responsible for safeguarding the export of restricted technology.

Mr. Shultz also gave a pointed scolding to the European anti-nuclear peace movement, which is particularly strong in Norway and Denmark, which he visited before coming to Oslo.

That happened when he was asked if pressures from the peace movement had made possible the

scandal that began with the peace movement.

Then he added: "I would hope that the people in the movement would take a second look and admit that they were wrong. In order to have peace, you have to show some strength."

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Nicaragua's Leader Plays Down Assertion On Military Buildup

By William Branigin
Washington Post Service

MANAGUA — President Daniel Ortega Saavedra said that plans disclosed by the defense minister for a major Nicaraguan armed forces buildup were merely a "proposal" to the government that had not been accepted.

He asserted that Nicaragua would have a "modest army" after the current civil war ends.

Mr. Ortega sought to play down a speech on Saturday by General Humberto Ortega Saavedra, who is his brother as well as the defense minister.

The president stressed Sunday that the Sandinist government was respecting a Central American peace accord and was willing to negotiate arms reductions with its neighbors and the United States.

"We have talked of having all our population learn to handle arms to be ready to defend the country," Mr. Ortega said, "but not of organizing an army of 600,000 men, because this would not make sense. This country could not support an army of that magnitude."

The president said that what the government had in mind was a defense system such as Switzerland's, in which "the entire population is ready to defend the country."

His account of the military plans contrasted sharply with the statements by his brother. Those statements appeared to confirm allegations by a Sandinist defector, Major Roger Miranda Bengoechea, regarding military cooperation protocols between Nicaragua and the Soviet Union.

Asked about his brother's account of a 15-year plan to build up the Sandinist regular armed forces, reserves and militias to a total strength of 600,000 by 1995, Mr. Ortega said: "No, this plan does not exist. The statement that General Ortega made yesterday is in the context of the war of the people, if this war continues or intensifies."

"This is a proposal of the army for the government, but it has not been accepted by the government of Nicaragua."

At another point, Mr. Ortega said the figure of 600,000 was contemplated largely in terms of reserves that could be mobilized to combat an invasion.

The president said the defense minister's statements were "linked to the time of war that Nicaragua is living through," a period marked by U.S. aid for the guerrilla force known as the contras, and the acquisition by Honduras of F-5 fighter planes from the United States.

"We have always thought that once this war ends, the army here should be a modest army," Mr. Ortega said.

The Sandinist leader made the statements after a speech in which he told an assembly of union delegates that the Sandinist National Liberation Front would not give up "revolutionary power" or allow domestic opposition groups to become an "internal front" of the contras.

Issuing a stern warning to opposition groups and news media of "the right" to "act with responsibility," Mr. Ortega said the Sandinist government would "mobilize the workers of all companies to go to combat" if necessary.

The president's attempt to clarify his brother's remarks conflicted with a description in the alleged Soviet-Nicaraguan protocols of a Sandinist military buildup independent of the current war with the contras and the regional peace efforts.

The alleged protocols, described as covering military cooperation between Nicaragua and the Soviet Union, were among documents that U.S. officials said had been provided by Major Miranda.

One passage estimates that the rebels will suffer "total defeat during the period 1988-90" and states that the subsequent goal is to be able to defeat a U.S. invasion.

Asked whether such agreements exist, Mr. Ortega said Nicaragua has relations "of a military type" with Moscow.

"We are not in an agreement as such in the terms that Miranda tried to present," Mr. Ortega said, "but they are records that Nicaragua has reached as to assistance from the Soviets and that cover the necessities for the defense of the country."

Talks Postponed

The Nicaraguan government postponed a second round of peace talks with the rebels only hours before it was to begin on Monday in the Dominican Republic, church and diplomatic sources said. Reuters reported from Managua.

The sources said the government wanted more time to prepare for the talks, which would have brought representatives of the two sides face to face for the first time.

One Latin American diplomat close to the cease-fire negotiations said no new date for the talks had been fixed, but he said he believed that a meeting might take place Wednesday or Thursday.



DUMPED CHEMICALS — White tank cars containing vinyl chloride lying on the track next to burning cars containing liquid propane following a derailment near Round Rock, Texas. The accident, which occurred late Saturday, caused the evacuation of 5,000 in the town.

U.S. High Court Splits in Abortion Case

The Associated Press

WASHINGTON — An evenly divided Supreme Court struck down on Monday an Illinois law that could have limited the right of some teen-age girls to have abortions.

By a 4-4 vote and with no accompanying opinion, the court upheld an appeals court ruling that the Illinois law impermissibly interferes with abortion rights.

The law required some girls under age 18 who seek abortions to wait 24 hours to have the operation after telling their parents or a judge about their decision. The appeals court had ruled that the waiting period infringed on the right to have an abortion but left intact the requirement of parental notification or judicial permission.

The even split on the Supreme Court raises the possibility that the panel could reconsider the abortion issue with nine justices participating.

That possibility is one reason that President Ronald Reagan's

nomination of Judge Anthony M. Kennedy to fill the current court vacancy may be decisive to future rulings on state regulation of abortion.

Judge Kennedy's views on the subject are not known, but he is expected to be asked about the Supreme Court's 1973 decision legalizing abortion during his Senate confirmation hearings, which begin Monday.

Easy Confirmation Seen

Earlier, Linda Greenhouse of The New York Times reported from Washington:

Judge Kennedy, Mr. Reagan's third choice to fill the Supreme Court vacancy left by the June retirement of Justice Lewis F. Powell Jr., appears to be headed for an easy confirmation.

There is almost none of the passion that animated both the left and the right in the weeks of Senate debate over Mr. Reagan's first choice, Judge Robert H. Bork. Judge Kennedy's confirmation

hearings are expected to take no longer than a week.

After the Senate rejected Judge Bork, the president nominated Judge Douglas H. Ginsburg, who withdrew his name nine days later, after acknowledging that he had used marijuana in the 1960s and 1970s.

There is a sense of relief in both the Senate and the Reagan administration that another bruising battle can be avoided.

The sense of relief appears to be well founded. No senator has come out in opposition to Judge Kennedy. The chairman of the Judiciary Committee, Joseph R. Biden Jr., Democrat of Delaware, who was one of several influential senators to announce early opposition to Judge Bork, has called the new nominee's confirmation chances "very good."

The American Bar Association committee that evaluates judicial nominees, which was deeply split over Judge Bork, unanimously gave him his highest rating last week to Judge Kennedy, who sits on the U.S. 9th Circuit Court of Appeals in California. The major participants in the liberal coalition that worked to defeat Judge Bork have remained silent.

While more than 100 witnesses testified at Judge Bork's three-week confirmation hearing, only 32 people have asked to testify at Judge Kennedy's hearing.

One witness scheduled to testify on Judge Kennedy's behalf is Laur

ence H. Tribe of Harvard Law School, who delivered powerful testimony against Judge Bork but has praised Judge Kennedy.

Yet relatively little is known about Judge Kennedy's views on the questions that are at the forefront of current debate on the U.S. Constitution.

At stake in this nomination is the balance of power on a Supreme Court that is sharply divided not only on questions like abortion but also on affirmative action hiring requirements and the constitutional relationship between church and state. Judge Kennedy, who is 51, has spent 12 years on the federal bench and written nearly 500 opinions, but he has no clear position on these issues.

Further, he has expressed no sharply defined constitutional philosophy and no particular desire to arrive at one, even observing in a speech last year that maintaining a "zone of ambiguity" about the way the constitution allocates power might be a virtue in itself.

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David S. Broder
Washington Post Columnist

OPINION

Gorbachev's Two Faces: Realities to Reckon With

By Anthony Lewis

BOSTON — Self-confident and charming, Defiant and truculent. The Mikhail Gorbachev who appeared in the United States was both those men. An image of Soviet leaders operating behind walls was shattered by this figure leaping out of his limousine to shake hands on a Washington street. What could show more self-confidence than a Russian ready to play by U.S. rules, pressing the flesh, working the cameras? He charmed even conservatives.

But when he was asked about human rights, he bristled. "We're not going to let the Americans lecture us," he told a group of publishers and editors. "Why doesn't the American administration trust 280 million Soviet people who made their choice?" of government? And again at his press conference: "The Soviet people made their choice in 1917."

The two Gorbachevs are both realities, and we are going to have to reckon with them. We must try to understand why and how they coexist.

When Mr. Gorbachev says that his people "made their choice in 1917," he is not likely to persuade most Americans. The Russian revolution was carried out by a small, disciplined minority. In our sense of democracy, the Soviet people never have had a choice: a free election.

The U.S. Constitution was written by a small elite group of men, but they took extraordinary steps to test public acceptance of their work. Each of the 13 states had its own convention to decide whether to ratify the Constitution, and some were closely divided. The day Mr. Gorbachev came to Washington, Dec. 7, was the 200th anniversary of the first state ratification, Delaware's.

Could it be, then, that some subconscious doubt about the Soviet system's legitimacy explains Mr. Gorbachev's defiance? That is a natural thought for Americans, given U.S. history. But those who know the Soviet Union well



Islam Holds the Key to an Afghanistan Settlement

Selig S. Harrison's opinion column "A Chance to Serve Peace in Afghanistan" (Dec. 7) suffers from structural flaws and ignores established facts. As he argues, there is a chance — indeed a big one — to serve peace in Afghanistan, but it is essential to understand why this chance seems to be available now.

The most important single reason is self-evident: the increasingly heavy toll of lives and material losses suffered by the Soviet Union as a result of the heroic, unwavering resistance put up by the Afghan guerrillas ever since the Red Army invaded the country in 1979.

Since the first days of the Soviet occupation, it has been the Islamic resistance groups, commonly known as mujahidin, that have initiated, organized and led the actual fighting. It is these groups who have suffered most as a result of the Soviet aggression in Afghanistan. Without them, Afghanistan would have been turned into a vassal Communist country much like any one of the satellite regimes in Eastern Europe, if not a part of the Soviet Union itself, like the Soviet republics of Central Asia.

I would respectfully suggest that Mikhail Gorbachev donate his \$120,000 peace award from the Indira Gandhi Memorial Trust (People, Nov. 26) to relatives of the thousands of Afghans who have been killed or maimed by the Rus-

ian army during his tenure as Soviet leader. Of course, this is a long and difficult process; but it must start sometime. It requires a profound change propelled by a fresh current of thought capable of changing world opinion, not unlike the philosophical movements that prepared the French and American revolutions in the 18th century.

DON C. YAGER
Seeb, Oman

A Fresh Current of Thought

The opinion column written by Richard M. Oyer and Jean-Jacques Servan-Schreiber, "Untie the SDI Knot With an Offer of Joint Research" (Dec. 1), was first-rate. Sharing the research task between the United States and the Soviet Union is a brilliant idea. It is a example of the many acts of leadership which the authors say are needed to overcome the mutual distrust at the root of

Southeast Asians Agree To Tighten Trade Links

By Barbara Crossette
New York Times Service

MANILA — The leaders of six Southeast Asian nations opened their first summit meeting in a decade on Monday and called for greater economic cooperation among themselves and an end to the Vietnamese occupation of Cambodia.

Agreements to reduce regional trade barriers and begin more joint ventures among members were endorsed without reservation by the six leaders: Presidents Corazon C. Aquino of the Philippines and Suharto of Indonesia; Prime Ministers Lee Kuan Yew of Singapore, Mahathir bin Mohamed of Malaysia and Prem Tinsulanonda of Thailand, and Sultan Muda Hassanal Bolkiah of Brunei Darussalam.

But there is still uncertainty on how to proceed on the region's most vexing security and political problem: the presence of up to 140,000 Vietnamese troops in Cambodia, and 40,000 in Laos.

A week ago, there were high hopes for at least the foundations for a solution to a nine-year-old guerrilla war in Cambodia.

In early December, Prime Minister Hun Sen of Cambodia and Prince Norodom Sihanouk, who leads a resistance army against the Hanoi-backed Phnom Penh government, met for the first time, in France. In an atmosphere of cordiality, they announced that they were set to begin a process of negotiation.

Then, at the end of last week, Prince Sihanouk suddenly canceled two future rounds of talks.

The prince, on temporary leave from his position as head of the resistance coalition, which holds the country's seat at the United Nations, indicated first that he could not go on with negotiations without the backing of his two co-

aliates, the noncommunist Khmer Peoples' National Liberation Front and the communist Khmer Rouge. He later was reported to have also lashed out at Phnom Penh for attempting to make him a "lackey of the Vietnamese."

The sudden turnaround caught the Association of South East Asian Nations off guard. Most of all, it has caused consternation in Indonesia, whose foreign minister, Mochtar Kusumahadija, has been acting as the organization's go-between with Hanoi.

Last summer, Mr. Mochtar was reported to have been told by the new Vietnamese Communist Party leader, Nguyen Van Linh, that the Cambodian war was exacting a toll on Vietnam — the first such admission by a Vietnamese leader, according to officials close to the Indonesian leadership.

Mr. Mochtar had been confident that a negotiating procedure could be sustained, given Vietnam's new posture. Diplomats in Phnom Penh said that the Soviet Union had also apparently decided to press for a resolution in Cambodia that would reduce its expenses there.

Prime Minister Lee Kuan Yew of Singapore reflected these views when he said in his opening remarks that "the communists of Vietnam, Laos and Cambodia are in distress."

Some officials in the association are now concerned that Prince Sihanouk, who is seeking to explain his position more fully in talks with regional leaders next month, might be planning to return to Cambodia for personal reasons, without reference to the policies of ASEAN, which has demanded the withdrawal of Vietnamese troops as a pre-requisite to a settlement.

The prince, who recently turned 65, has said often that he fears dying outside his native country.

Gorbachev Tops Reagan in U.S. Poll

By Richard Morin
Washington Post Service

WASHINGTON — Americans with a favorable view of Mikhail S. Gorbachev now outnumber those with a favorable opinion of President Ronald Reagan, although the summit meeting last week produced immediate but perhaps temporary political gains for Mr. Reagan and reversed sagging public confidence in his administration.

The latest Washington Post-ABC News survey disclosed that nearly two-thirds of those interviewed — 63 percent — said they had a favorable impression of Mr. Gorbachev, while 61 percent said they had a favorable view of Mr. Reagan.

However, Americans did view Mr. Reagan as more effective than Mr. Gorbachev at the summit talks: 42 percent of those surveyed said Mr. Reagan did the better job at the meeting, while 26 percent chose Mr. Gorbachev.

The survey also showed increased support for the treaty on intermediate nuclear forces, which banned medium- and shorter-range missiles in Europe. This was probably due to the tenuously positive publicity about the agreement during the summit week.

Slightly more than three out of five Americans — 62 percent — said they favored the INF agreement, up 10 percentage points from a Washington Post-ABC survey conducted prior to the meeting.

When those who said they had no firm opinion were asked which way they were leaning, support rose to 82 percent.

Only 6 percent opposed the treaty.

But the Reagan presidency may have been the clearest early winner of summit week. The evidence:

Mr. Reagan's overall job approval rating rating surged eight percentage points to 58 percent in less than two weeks to the highest it has been this year.

Almost three out of five, 57 percent, said they approved of the way Mr. Reagan was handling foreign affairs, his best showing in 15 months and up 11 percentage points in less than two weeks.

More than three out of four, 77 percent, said they approved of the way Mr. Reagan was handling relations with the Soviet Union, up 11 percentage points since the pre-meeting poll and the best rating of his presidency.

Nearly half, 49 percent, said the United States was generally going in the right direction, up from 35 percent in the survey before the meeting.

The survey was conducted from Dec. 11 to Dec. 13.

A total of 1,007 adults nationwide were interviewed by telephone for the poll.

The margin of sampling error for the overall results was plus or minus three percentage points.

RADAR: U.S. Sets Treaty Condition

(Continued from Page 1)

could not be used to manage a nationwide ballistic missile defense system, which the treaty barred.

The Soviet network of nine electronic phased-array radars initially was planned by the Soviet Defense Ministry during the late 1960s, Soviet and U.S. sources said.

According to several sources, Soviet defense officials placed eight of the radar complexes at border sites, but chose the Krasnoyarsk site to save money. Had it been placed closer to the periphery, as required by the treaty, more than one facility would have had to be built and the cost would have been 10 to 20 times larger, these sources said.

The Politburo approved construction of the network in the ear-

ly 1970s, about the time the treaty was being signed.

A Soviet official said that Mr. Ustinov did not tell the Politburo that Krasnoyarsk potentially violated the treaty, but that Andrei A. Grromyko, then the foreign minister and a Politburo member, must have known, as the Politburo legal staff must have.

The Soviet Defense Ministry sources said, expected the violation to be discovered by U.S. satellites, but focused on containing Washington's protest for years in the U.S.-Soviet committee set up by the ABM treaty.

The Soviets hoped to be allowed to continue construction in exchange for dropping objections to what they would charge were U.S. violations. At first they brought up the so-called Faws phased-array radars being built at air force bases in Massachusetts and California, and later the U.S. upgrading of radar units in Fylingdales, England, and Thule, Greenland.

When Mr. Reagan announced his space-based anti-missile program, the Strategic Defense Initiative, in March 1983, Soviet defense officials used its potential to break the ABM treaty.

The Pentagon discovered the construction at Krasnoyarsk in July 1983, more than 18 months after it began, U.S. sources said.

About a month later, a U.S. source said, the issue of the radar complex was raised with the Soviet Union at the joint consultative committee. The Soviets described it then as a "space-tracking" facility allowed under the ABM treaty.

Mr. Ceausescu asked the meet-

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He made the announcement a month after workers angered by severe food and energy shortages, held the biggest political protest in Romania since the Communists took power in 1947. Workers rioted in "Brasov," the country's second-largest city, in mid-November.

"We understand the role of the economic laws," he said, "but we can hardly admit that the settlement of the problems posed by economic and social development might be determined by the law of supply and demand, by market laws."

"It is difficult to ensure progress through so-called market socialism," Mr. Ceausescu said.

Romania has cut its foreign debt from more than \$10 billion to less than \$6 billion in less than five years. At the current rate, it should have paid them all off by 1991.

(AP, Reuters)

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Technology

Issue No. 3

DEPARTMENTS

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Fiat's Termoli engine plant was a technological breakthrough when it opened in 1985. Next month, the company will take innovation a step further with startup of a fully automated body and final assembly plant.

Computers 8

After Wall Street's "Black Monday," instant analysts seeking a scapegoat were quick to point to computers. But behind the machines, there is man.

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The world's first fusion reactor moves closer to reality with a multi-nation, East-West agreement to join forces — and resources — on an experimental design.

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Air express companies are in the midst of a technological revolution as they race to get your packages from there to here, faster and more reliably. Meanwhile, European and Japanese companies are pushing ahead with development of cinema quality, high-definition television.

Research 11

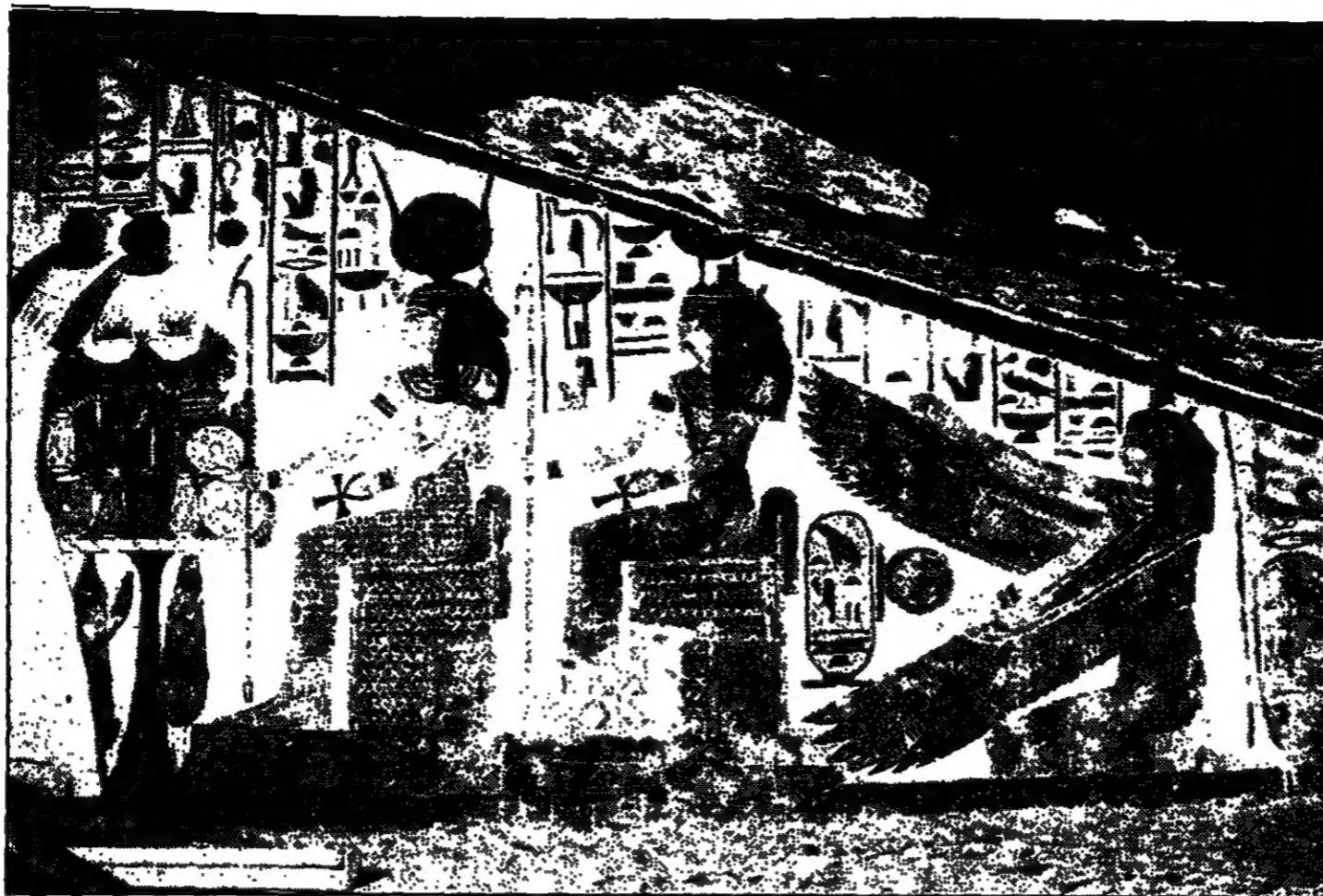
Two Japanese companies have developed a water-thin battery that could be used in "smart" cards. The Pentagon is backing research in gallium arsenide integrated chips. In Notebook.



Intel Corp./Handout

Next Issue

Some countries fare better at fostering the research environment that will result in tomorrow's technological breakthroughs. Is there more to their success than cold, hard cash? These and other issues on March 16, in Technology Quarterly.



Courtesy Michael for the Getty Conservation Institute

Man, Machines Restore a Measure Of Life in the Tomb of Nefertari

By Souren Melikian

LUXOR, Egypt — In a few years, if all goes according to plan, the first visitors other than archaeologists, scientists and restorers will walk down into the funerary chambers that were dug out, some time after 1255 B.C., on a hillside at Luxor, in Upper Egypt. The embalmed body of Queen Nefertari, "Great Royal Wife, Lady of the Two Lands, Appearing the Gods, the Beautiful-Faced One..." was deposited there. But it had long vanished when Italian archaeologists opened the tomb in 1904.

Few tourists will suspect that without modern technology they might not have been able to set eyes on the mural paintings celebrating the main wife of Ramses II.

They will gaze at brightly painted scenes in a miraculously state of preservation, which for the greater part have come down to us with their outline and color scheme unchanged over 3,250 years or so, during which they survived — at least

SOUREN MELIKIAN writes on art and the art market for the International Herald Tribune.

New tools offer unprecedented information.

one break-in, in ancient times, possibly about the Roman period.

More importantly, they have survived substantial damage since the tomb was discovered by Ernesto Schiaparelli. The causes of the damage have varied from kicks by passing visitors, detaching bits of plaster, to clumsy "restoration" work, including crude overpainting. Recent changes of climate in the Luxor area noted by a Canadian team from Toronto University, which investigated the tomb from 1977 to 1981, have also worried scientists.

Above all, a slow but ominous transformation of the painted surface appeared to be under way.

Years were wasted. During this time, amateur

ish reports were made, and, to quote two Egyptian officials, "scientifically motivated surveys and exploratory missions... produced only general memoranda." It is probably an exaggeration to say that the intervention of the Getty Conservation Institute turned the tables and rescued one of the most precious heirlooms of the Ancient World.

Two key men made this possible: Ahmed Kadry, who was appointed director-general of the Egyptian Antiquities Organization in 1977, and Luis Monreal, who became the director of the Getty Conservation Institute in 1985.

Mr. Kadry was first made aware of the urgency of the problem by the Cairo University Report published in July 1980, which discussed, among other problems, the infiltrations of salt-laden rainwater. Three Canadian reports, particularly "Chemistry and Physics in the Tomb of Nefertari" and "The Internal Climate of Nefertari," deepened his anxiety in the face of a lack of funds and the inertia of international organizations.

It is at this juncture that Mr. Monreal appeared. A trained archaeologist and art historian, who was secretary-general of the International Council of Museums (ICOM) from 1974 to 1985.

Continued on page 11

New Radar Systems Peer Farther, Hide Their 'Signatures'

The USS Stark incident showed dependency on radar sensors and their deficiencies.

By John A. Adam

WASHINGTON — Radar sensors on the AWACS sentry aircraft flying over the Gulf last May 17 detected an unknown aircraft around 7:55 P.M. The crew designated the blip "Track 2202" and alerted U.S. ships in the area through the Navy Tactical Data System. There was no immediate cause for alarm.

As the aircraft headed farther south, AWACS updates on Track 2202 became more frequent, and radars and other electronic apparatus on ships confirmed the blip to be a single Iraqi F-1 Mirage fighter flying about 3,000 feet (914 meters) above the water.

Around 9 P.M., the lone Iraqi pilot switched on his Cynano IV fire-control radar to search for targets abeam.

Crewmen of the USS Stark, hunched over luminescent screens in the darkened combat information center, picked up the emissions and realized that the fighter was within striking distance.

The rest is known all too well. Through a series of blunders, the Stark failed to ward off two radar-guided Exocet missiles fired by the Iraqi plane. Remarkably, the launchings of the missiles apparently went undetected by the ship's various radar operators.

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The navy's report on the incident was released in October. The version sanitized for the public masks out all sections involving the performance of the Stark's radar, leading some readers to conclude that human error was entirely to blame. But reading between the lines makes it apparent that glitches in the ship's radar and electronics may have contributed to the disaster, as the Stark's former captain, Glen R. Brindel, contends.

The missile "wasn't seen on any of

JOHN A. ADAM is an associate editor of *IEEE Spectrum*, a monthly publication of the Institute of Electrical and Electronics Engineers. He wrote this article for *The Washington Post*.

the ship's radars," Captain Brindel says. "If the sensors would have divulged the things they should have, then I'm sure my TAO [tactical action officer] would have taken additional measures."

The Stark controversy not only shows how dependent ships, aircraft and missiles are on radar sensors but also points to deficiencies in some of today's systems. Most search radars like those on the Stark, which belongs to the navy's newest class of frigate, rely on mechanically steered antennas that re-scan an area every few seconds, a relatively long time in many battle situations.

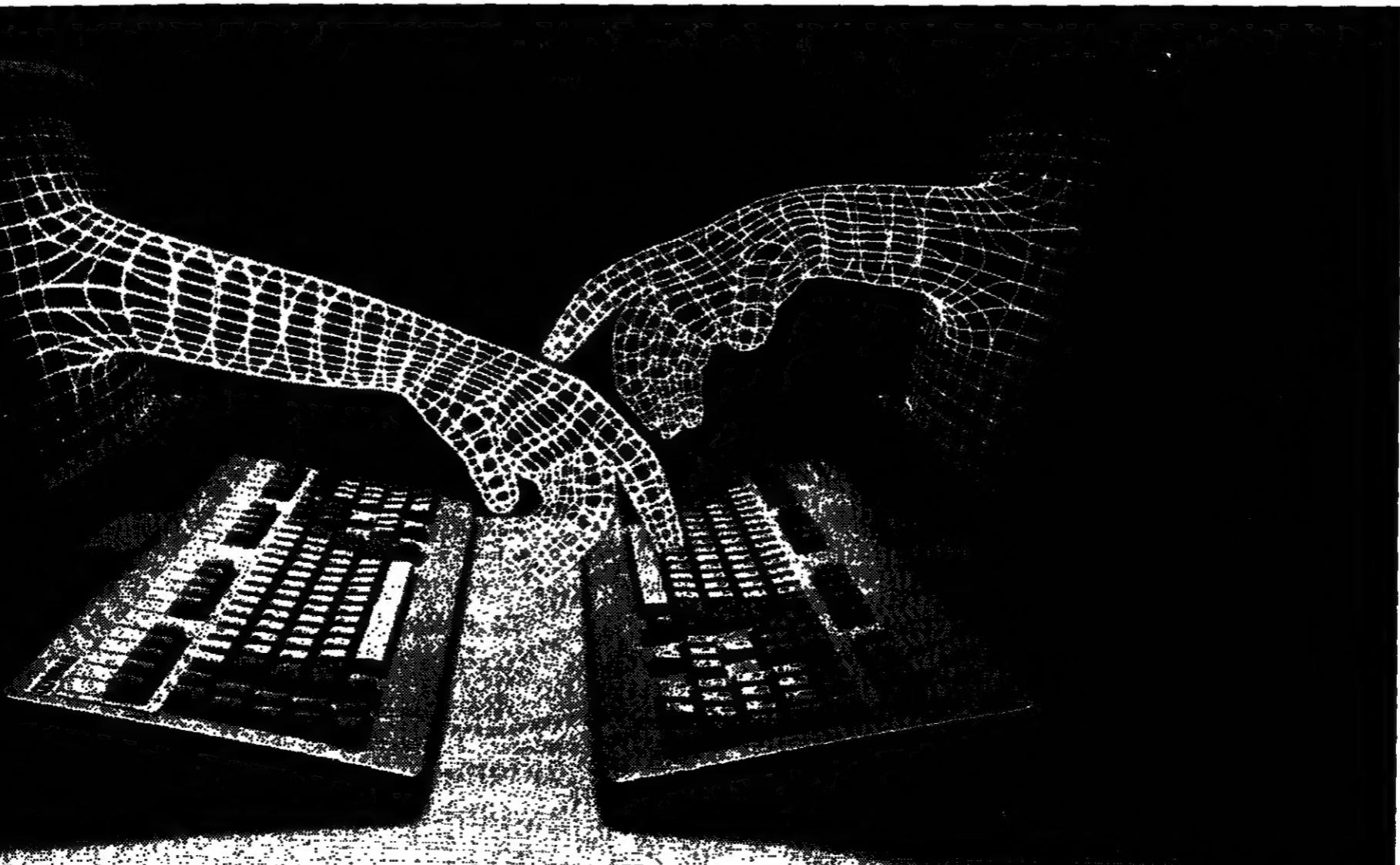
The slow scan-time problem is exacerbated when radar is called upon to do more chores, from navigation to tracking of hostile and friendly forces to directing missiles to their targets. In the starboard sensor, relied on since World War II, still up to the job?

RADAR (radio detecting and ranging) is often preferred to "passive" infrared or optical sensors because it measures distance accurately and can therefore be used to distinguish target range. It has the added benefit of long-range detection and the ability to see no matter what the weather. But its strength is also a military liability. By emitting signals, radar often gives away its identity because it has a distinctive "signature" based on its transmission parameters.

Passive sensors, those that rely solely on receiving emissions from potential targets, are often good for identifying targets but cannot measure range well. Without knowing the emitter's strength, it is impossible to determine how its signal was affected by distance. The U.S. military now favors a mix of "active" radar and passive sensors to monitor its adversaries.

New radar systems range from colossal over-the-horizon backscatter radar, which bounces waves off the ionosphere to detect aircraft as far as 2,000 miles (3,232 kilometers) away. Continued on page 10

The electronic factory: teaching machines to like one another.



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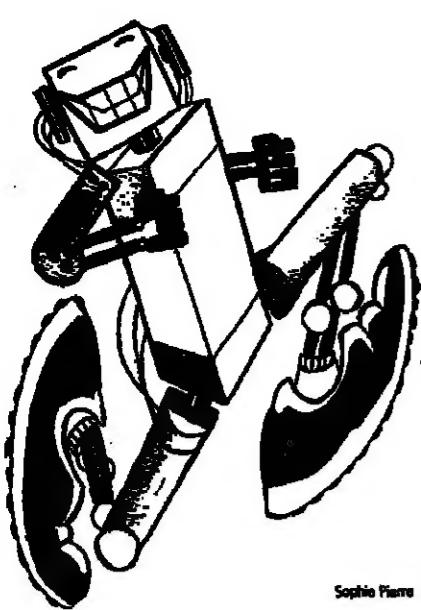
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AEG

Technology Workplace



Leggy Robots Get New Gait In Lab Room

NEW YORK — Although there are robots that move around American factories on fixed tracks or computer-controlled vehicles, most are fixed firmly to the floor.

Things are livelier in the laboratory. A handful of researchers are slowly chipping away at the formidable challenge of mounting robots on reasonably nimble legs. One research team led by Professor Marc Raibert at the Massachusetts Institute of Technology recently succeeded in getting a quadruped robot that formerly trotted to bound across their 55-foot (16.7-meter) room.

"It looks like a slow run," said Professor Raibert of the device's newest gait, which should help scientists learn more about how humans and animals move and balance.

On a less cerebral front, Odetics Inc., a company based in Anaheim, California, is currently working on a six-legged maintenance robot for the Electric Power Research Institute. Although the device, designed for work inside nuclear power plants, is not scheduled for delivery to the research group until the end of next year, Odetics is already working with the University of Florida to design the next phase in robotic maintenance machines — a snake.

"The robot snake is targeted for spaces where you have masses of pipes," said Thomas Bartholet, general manager of Odetics' Intelligent Machines Division. Odetics envisions a 30-foot device, made up of 2-foot segments with wheels on each side. It would carry tools on its back and the first 10 feet would operate like a robot arm when it gets to its destination. (NYT)

Robotized Fiat Plants Look Toward the 'Disposable Car'

The goal is the opposite of Henry Ford's Model-T.

By Henry Tanner

TERMOLI, Italy — When it was opened in March 1985, the Fiat engine factory south of this small fishing town on the Adriatic coast was a technological breakthrough.

Built to produce a new engine for small cars — the FIRE-1000, standing for Fully Integrated Robotic Engine — it marked, according to Fiat, the first successful attempt by an automobile manufacturer to design and develop a new factory and a new engine together at the same time, shaping each for the best advantage of the other.

"We designed the technology to produce this engine, and we developed the engine to be produced by this technology, with the best possible combination for both," said Paolo Marinsek, the young aeronautical engineer who is the plant's director.

Leading a visitor past a mile-long snaking row of diversely colored, odd-shaped and seemingly unattended machines in perpetual motion, he said, "You imagine how excited we were. This had never been done before; we put the machinery down on the grass and built the factory around it."

Current production is 2,700 engines a day, with a workforce of 900, including office staff, and will reach 3,000 by the end of next year, according to Mr. Marinsek.

The Termoli engine plant, still one of the most highly robotized in the world, has a special place in the development of Fiat technology. The next major innovation is a fully robotized body and final assembly plant at Cassino, north of Naples, where the group's new medium-size model — the Tipo — will go into production on Jan. 26.

The final assembly facility at Cassino, Fiat executives say, will be a novelty in automobile manufacturing because all the elements of the car, from engines and gearboxes to the doors and seals, will be assembled and fitted into the body by a fully automated system of computer-guided robots for the first time.

The new facility will be for final assembly what Termoli was for engines. The product and the factory — the new car and the new system of robots — have been developed simultaneously, each with the other in mind.

The Tipo, a hatchback, will replace the Ritmo as Fiat's medium-range model, between the small Uno and the large, more expensive Croma. The medium-range market accounts for about a quarter of all automobile sales in Europe.

Cassino, like Termoli, will be a "milestone"



In the "robogate," big, gate-shaped robots take in auto body parts and turn out fully welded bodies.

in automobile manufacturing. Fiat officials say, biting their tongue to keep from using the immodest word "revolution."

Both concepts were developed and tested at Mirafiori, the company's sprawling main plant in Turin. It took three years of experimenting before Termoli was ready for construction and at least as long to lay the groundwork for the new facility in Cassino, which has been producing the Ritmo.

Engineers at Termoli and Mirafiori are working on the adaptation to other engines of the robotization methods used for the FIRE-1000.

Also in the development stage is a new facility in Termoli for computer-steered robotized production of gearboxes, using more than 180 different robots. This will replace the conventional gearbox production plant next to the new engine plant. The robotization of gearbox production is more difficult than of engines because it involves many more moving parts, according to Mr. Marinsek.

Comau, the Fiat group's own manufacturer of robots and robotized systems, has played a key role in all these innovations. In Termoli, Cassino and the two plants in Turin, it has designed systems using its own robots and those of many other manufacturers. It has sold its systems to other automakers, including General Motors, Toyota, BMW, Ford-Europe and, most recently, Jaguar.

From Mirafiori (and the Uno) to Termoli, to the new Tipo plant in Cassino and back to Turin for the Uno's successor in the 1990s, the guiding principle is always the same, Fiat executives say: maximum flexibility.

The goal is the opposite of Henry Ford's

Model-T, they say. Instead of the largest possible number of cars to be produced by the same machinery, they are trying to come up with a technology that permits them to change from one variation to another, and even from one model to another, in the shortest possible time at the smallest cost.

They point out that Lancia Thema and Fiat Croma are turning being assembled by the same machines at Mirafiori. At various neuroligic spots in the factory, Comau engineers are supervising the installation of new machinery that will make such changeovers quicker and more commonplace.

Fiat, says one of its executives, has pioneered the "pessimistic" approach to automobile production.

The reasoning goes like this: "We are not Japanese, we are in Europe; we know the market is limited and will probably shrink. The goal, therefore, is not to produce the greatest number of cars most cheaply but to get the lowest possible break-even point at which we can hold production of one model, or one variation of a model, and still be profitable."

Japanese factories, he said, may be producing anywhere between 6,000 and 8,000 cars a day; the Uno, Fiat's best-selling car, is produced at 3,200 a day.

Fiat executives decline to name the break-even point for the Uno. But it is known that the \$1 billion investment for the model was amortized in less than three years.

The group now produces between 29 and 30 cars per worker per year, not counting the

Alfa Romeo plants that were added to the group earlier this year. The figure was 14 cars per person a year in 1981.

The group has formed separate joint ventures with IBM and Digital in a bid to achieve an advanced system of Computer Integrated Manufacturing embracing all its operations.

Cars are increasingly like household appliances, an industry analyst said, "they are supposed to be inexpensive and to have a reasonably long lifespan with a minimum of maintenance and repairs, and only maximum automation can produce this and still reduce the price."

"They are trying to invent the disposable automobile," said a banker dealing with car companies.

At Termoli, the production lines were switched on at 6 A.M. Monday and kept running until 6 A.M. Saturday. The workforce of 900 men and women work around the clock in three daily shifts for five days.

They operate computers and man testing stations and other islands of human activity along the more than 2 kilometers of machining and assembly lines.

In between the human islands, the robots of different shapes and colors with articulated arms and fingerlike claws move incessantly and in virtual silence; they select components, lift them, turn them around, lower them into the right position and insert them delicately into a bigger part that then moves on to the next robots.

A lighted panel above the entrance to the headquarters building registers the daily production. At 17:13 P.M. the other day it stood at 1,207 engines for the day.

TERMOLI, halfway between Pesaro and Bari on the Adriatic coast, is part of an agricultural region. Although better off than many of the other southern regions, it is unmistakably part of the Italian South.

The workers have been recruited locally. Many of them are women, and for most of them this is their first industrial job. They go through a training period of eight months.

"Many find it at first more difficult than their counterparts in Milan and Turin, where young people grow up in an industrial climate," said Mr. Marinsek.

The factory has become a point of local pride. Sandro Pertini, when he was president, came to visit. The King of Sweden was here recently, and Japanese delegations just keep coming.

Mr. Marinsek, who is 36, has returned the compliment and gone to Japan. He concluded that his plant was at about the same level of automation in some aspects as the Japanese plants and "more advanced in others." But worker productivity is still higher in Japan, he said. "The average age of our workers is 47, in the Japanese plants it is 32; they are in an unbelievable hurry."

HENRY TANNER is on the staff of the International Herald Tribune.

World's Plan to D

By Robin Herman

PARIS — The four world heavyweights in fusion power research — the Soviet Union, the United States, the European Community and Japan — have agreed to do together what would be the world's

biggest fusion reactor.

The Project, Experimental Reactor-ITER, would be the cornerstone of an advanced reactor plant and would demonstrate reactor safety and prove the engineering feasibility of fusion power.

ITER is expected to take three years to build. The design work will cost about \$100 million. When that phase is completed, by 1991 the four partners would be better to plunge ahead and build a machine in unison or separately.

"There's a great deal in one's eye at the beginning of the project," said Jean-Pierre Lévy, head of the physics department of the International Energy Agency, which presided over the four-nation agreement.

The design team will be based at the International Project of General Electric's Research and Development Institute of Paris.

At the Paris institute, the machine will start the basic form of the machine will be planned. A line of engineers will first be trained in Paris. Next year, American and Japanese engineers will be added.

ITER is the world's first fusion research machine to be successful.

A fusion reactor would extract energy from the nuclei of light elements by fusing them together under the influence of their high heat.

HONG KONG

By Gary Adelman

HONG KONG — As elsewhere in Asia, the electronics industry in Hong Kong has grown rapidly in recent years, becoming an essential ingredient in the territory's overall mix of exports. Last year, electronics manufacturers accounted for almost 40 percent of Hong Kong's overseas sales, which totalled \$20 billion.

But the future for Hong Kong's second largest industry is now uncertain, for some entrepreneurs are afoot to set up new factories.

Unlike the territory's government and te

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MINOLTA

Technology Computers

When Computers Become Scapegoats

By T.R. Reid and Brit Hume

WASHINGTON — Wouldn't you know they'd blame a computer? Even before the final bell rang on Wall Street's "Black Monday," instant analysts were rounding up suspect to blame for the 508-point drop, the biggest one-day crash in the stock market.

Not surprisingly, one of the chief culprits was that all-purpose electronic scapegoat, the computer. The crash was the result of "computerized panic," the Wall Street Journal said. The president of the Pacific Stock Exchange blamed the market's disastrous day on "inhuman machines."

It is true that major financial institutions have been using computers to assist them in complex market strategies known as "programmed trading" or "computing-assisted trading." And it is not only the Wall Street giants who use computers to play the markets; all sorts of stock-market programs and information banks are available for investors equipped with nothing more than a personal computer.

But the suggestion that comput-

ers caused, or even contributed to, the crash reflects a fundamental misunderstanding of the role of computers in our modern world.

The computer is a tool, a par with the pencil, screwdriver or dishwasher. It can do only what humans make it do. It can enhance human feats and foibles, but does not cause them. To say that the computer caused the Wall Street crash is akin to saying the screwdriver caused the United States to enter World War II, because screwdrivers were used to build bombers, and without bombers there would have been no Pearl Harbor raid, and so on ad absurdum.

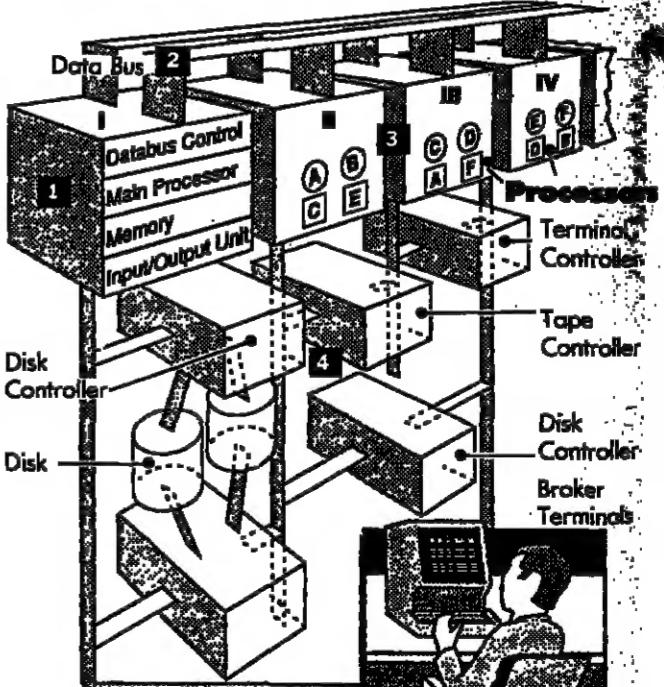
Before politicians and regulators go on a witch hunt to stay the beast called "computerized trading," it might be useful for them to learn what the term means. It refers to Wall Street applications for two familiar features of the computer revolution: high-speed electronic communication from one computer to another and high-speed number crunching. The big financial institutions do this on big machines, IBM 3850 mid-size computers or larger. They receive constant reports from different securities markets and constantly compare prices, looking for the best time and place to buy or sell.

The computers can be programmed to ring bells or flash lights signaling the optimum time to sell a certain contract on a certain exchange. But these "inhuman machines" do not decide when to buy or sell, any more than an alarm clock decides when you should wake up. The clock and computer ring only because some person has programmed them to under given circumstances.

Not many individual investors find it worthwhile to spend the time and money to set up the intricate programmed-trading functions. But hundreds of thousands of personal-computer owners use their machines to track and analyze market data. The opportunities available, even on simple home computers, are stunning.

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Not many individual investors



Redundancy Helps Computers At Stock Exchanges Stay On Line

1 Processors each have their own memory and software. A fault in one doesn't stop all, or any other. 2 Two data bases connect each processor to the network. 3 Processors store and update work of neighbors. Thus, processor II maintains record of work by III on deal C and IV on deal E while working on A and B. 4 Duplicated peripherals, such as disk files and terminal controllers, are each linked to more than one processor.

Lotus, the big Cambridge, Massachusetts, firm that publishes the world's most popular program, 1-2-3, offers a long list of investor support products. For the trader who has to know what is going on in the market every second, there is Lotus Signal. Signal is part hardware — an FM receiver that hooks into the modem port of any MS-DOS computer — and part software — a program that pulls market quotes out of that receiver and can manipulate the numbers.

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PC Stocking Stuffers for Christmas

CHRISTMAS in Paris? Armchair travelers need go no farther than their home computers with "Ticket to Paris" (for PC, Apple II and Commodore 64, from Blue Lion Software, Box 650, Belmont, Massachusetts 02178, 617-876-2500).

The player strolls around Paris, visiting landmarks (a graphics card is required) and talking to strangers who ask practical and historical questions, such as how to say certain common phrases in French, or the names of landmarks.

Blue Lion also offers "Ticket to London" and "Ticket to Spain." If the destination is not the attraction, try piloting a PC with Chuck Yeager's Advanced Flight Simulator program. Unlike tamer flight simulation programs, this one turns a PC into a cockpit to

teach advanced maneuvers and stunts (for IBMs or compatibles from Electronic Arts, 1820 Gateway Drive, San Mateo, California 94404; 415-571-7771).

The characteristics of 14 planes are simulated, from the Sopwith Camel through the rocket planes and experimental aircraft. Chuck Yeager made his precarious living

This is serious flying: A 46-page manual explains the functions of ailerons, elevators, flaps and much else. (NYT)

Technology Issues

New Radar Systems Can Peer Farther and Hide Their 'Signatures'

Continued from page 7

to "quiet" radars, which generate a rapid fire of beams transmitted in random sequence with constantly changing frequency. The goal here is to baffle enemy receivers with a signature that appears to be no more than random noise.

Other recent developments include: phased-array radar for the B-1B bomber and the Aegis cruiser that adds new dimensions to radar's dual use as a detector and an abettor in guiding weaponry; Doppler radar to distinguish moving targets from stationary ground clutter and, for civilian air transport, to detect hazardous wind shear; synthetic-aperture radar, using an

When radar is called upon to do more chores, from navigation to tracking to directing missiles, slow scanning is exacerbated.

tennis miles long, in effect, to peer through foliage and several meters into the ground; and the use of smart computers to analyze radar signals.

The phased-array radar, instead of using a typical mechanically steered antenna, employs a fixed flat plate that inside looks like a huge honeycomb, with its concatenation of cells. Each small cell in the array usually has its own antenna. Adjacent antennas radiate energy at the same frequencies. These signals interfere and reinforce each other to produce one large beam.

THE unique characteristic of the phased array is its ability to electronically steer the beam in milliseconds of a second, even though the antenna face rests immobile. When all the individual antennas send signals timed precisely in phase, the beam will be directed straight ahead. But by electronically orchestrating small delays across the face of the array, the beam can be shifted at great angles.

Each delay causes a signal to lag a fraction of a wavelength behind the signal from a neighboring element. The delays increase successively in a motion like rows of dominoes collapsing. The result is a change in the beam in the direction of the increasing delay (or where the last row of dominoes would fall). By varying the magnitude of the time delay, the angle of the beam is controlled.

Phased-array radar is the linchpin of the

Aegis cruiser, the navy's latest warship, as well as the B-1B bomber, the first operational aircraft to employ it. Because the system steers the beam electronically, it can be directed much faster than conventional radar. The B-1B's beam can be shifted in 150 millionths of a second (theoretically more than 6,600 times a second), compared with one- to two-second scans in mechanically steered systems.

The speed makes it possible to "interleave" various functions such as mapping the ground, following terrain and delivering weapons. In effect, the phased array can simultaneously track many targets while it searches for new ones.

PHASED-arrays require large amounts of computing power to send precisely timed commands to the thousands of cells across the array and assess the returns. This is one reason why they are only recently being put on ships and large planes. But with the miniaturization of computers, proposals are being made to put the phased array on small fighter aircraft like the F-16.

To distinguish moving targets from stationary ground clutter and tell how fast objects are moving, the military employs Doppler radar. It is also of interest to radar specialists at the Federal Aviation Administration, who hope to install Doppler systems at selected airports to prevent accidents caused by wind shear.

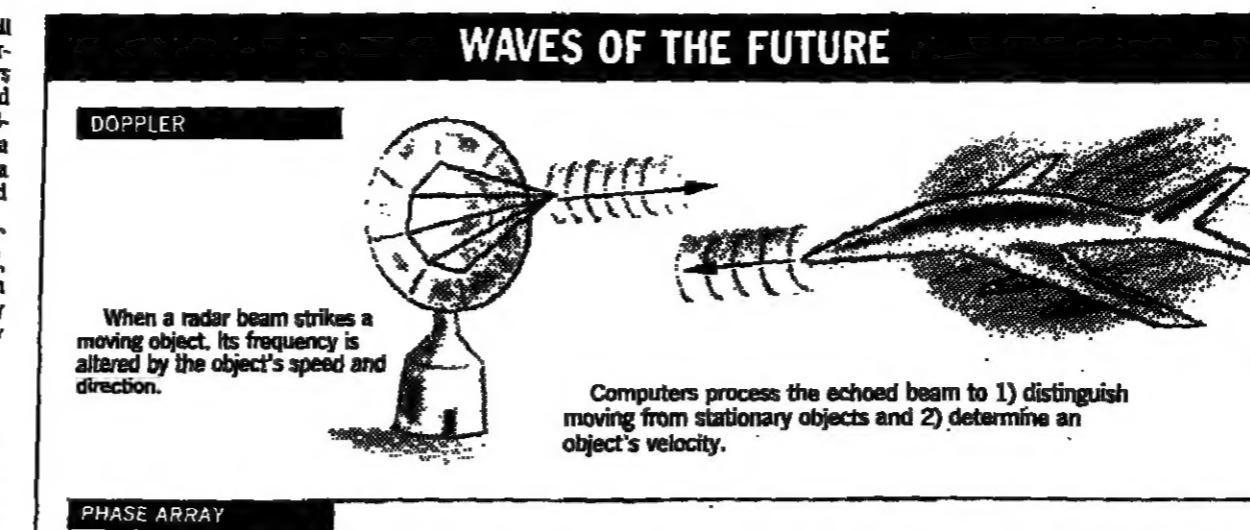
Many people are familiar with the Doppler effect by hearing the changing pitch of a passing train's whistle. As the train approaches, its pitch rises to a higher frequency, then drops as it leaves. This same principle is used to relate the reflected microwave energy to the speed of the wind or other targets. The echo returns at an altered frequency proportional to the speed of minute objects in the wind such as dust or to changes in air density.

Unlike conventional radars, Doppler radars measure this frequency shift of the pulses bounced from objects. Some bugs remain to be worked out. One problem is that radar sensitive enough to measure humidity differentials picks up many extraneous signals that need to be resolved. And such systems are expensive. The Terminal Doppler Weather Radars are estimated to cost about \$4.5 million per installation, and are expected to be installed starting in 1992.

Another development under way is the stationing of radar satellites in orbit. The incentive is great: Important parts of the Soviet arsenal, particularly in Eastern Europe, are often obscured by cloud cover. But radar can generate appropriate wavelengths not only to penetrate clouds but also to peer through foliage and even look beneath earth several meters deep to discover old river beds or buried mines.

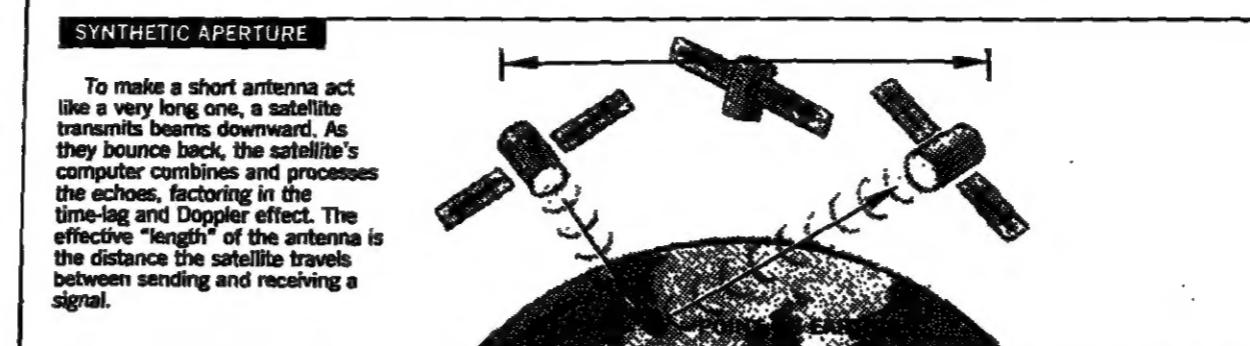
The potential of more precise radar satellite surveillance has been demonstrated by such civilian projects as the Seasat and Shuttle Imaging Radar experiments funded by the National Aeronautics and Space Administration. The key to each of these systems is the synthetic-aperture radar technique. This method takes advantage of a satellite's speed to make a small antenna work like one that is miles long.

While the transmitter sends signals, its antenna gathers echoes from points along the ground. A computer selectively combines these echoes, based on time intervals and the Doppler



Computers process the echoed beam to 1) distinguish moving from stationary objects and 2) determine an object's velocity.

SOURCE: Scientific American



Carol Pedersen and Peter Alden/The Washington Post

frequency shift of the signal relative to the moving spacecraft. The effective "length" of the synthetic antenna is equal to the distance that the satellite moves during the time a signal is sent and received.

In 1978, Seasat pioneered these high-resolution developments. From an orbit 800 kilometers high, it could resolve some objects of less than 10 meters. The length of its synthetic antenna was 15 kilometers. When its images were processed, the scutty of furrows from ship wakes astonished many people.

The Shuttle Imaging Radar, launched in 1984, took the Seasat approach a step further. Unlike Seasat, the shuttle's 11-by-2-meter antenna could be moved at different angles. This enabled three-dimensional views. A series of images of Mt. Shasta in California obtained from a spacecraft 225 kilometers high looked as if they had been taken by a person circling

the base of the mountain and pausing every 1,000 meters or so to snap a Polaroid.

There is much room for improvement, however. The use of multiple frequencies for radar imaging is a near-term possibility that Charles Elachi, project scientist of the Shuttle Imaging Radar at the Jet Propulsion Laboratory (JPL) in Pasadena, California, likes to going from "black and white to color." Each wavelength emitted would be reflected differently according to the composition of the material.

Both JPL and the Environmental Research Institute of Michigan in Ann Arbor have experimented with aircraft versions of such "color" radar for civilian and military uses.

Radar often collect data at such rates that humans cannot analyze the information fast enough. Studies in the 1960s and '70s by the Applied Physics Laboratory at Johns Hopkins University showed that radar operators often

missed targets even when they were detectable. The error rate, says a radar specialist, "caused a panic" and prompted navy work into computer-aided detection.

MANY navy ships employ automated detection systems to alert radar operators, who may be tracking numerous blips on their screens to new targets. The problem with many of them is that they cannot distinguish spurious targets (reflections from birds, ocean, ground or clouds) from real ones. Consequently, radar operators often prefer to switch off the automatic-detection mode.

But even if fully operative, systems such as those used on the Stark may have trouble spotting small, low-flying objects. Captain Brindel says that his radars were supposed to be able to detect Exocets "well beyond the visual horizon. They did not." And, he says, the

How Radar Systems Work

RADAR extends the range of the human eye. It can see through darkness, snow and cloud cover to locate objects and measure their distance. The principle is familiar. Dolphins and bats emit sound waves to gather information from their surroundings by sensing the echoes. Radar works the same way.

Electricity is converted into radio or micro-waves, which are beamed from an antenna at the speed of light. When the signal — usually a group of pulses — hits an object, the waves bounce back to the antenna, which has momentarily stopped transmitting so it can listen. Altered from bouncing off, say, an aircraft, the echoes are collected and processed by a receiver.

Each microsecond (millionth of a second) of round-trip travel corresponds to a distance of about 500 feet (152 meters). Additional information can be extracted by analyzing the alteration in each wave's shape.

Some radars do surveillance, scanning broad areas. Others are geared for targeting, where pencil-thin beams track a target continuously. And some, such as phased arrays, can search for new targets and track existing ones simultaneously.

Like the multiple frequencies of radio broadcasts, radar sensors can transmit on various channels.

High frequencies (and thus short wavelengths, down to a few millimeters) are often preferred because the components, particularly the antennas, can be made smaller and the beam can be focused better.

But transmissions in these frequencies degrade more rapidly in bad weather and the systems are often more vulnerable to countermeasures than systems using wavelengths of several meters.

Many military radars use variable frequencies — sometimes hopping across the spectrum bands randomly — to foil enemy countermeasures.

John A. Adam

First warnings came "almost simultaneously with the impact of the first missile."

The navy's October report conceded that the French-made Exocet can pose a "challenging threat" to such ship combat systems, especially when less than optimal attack angles and other conditions cause "degradation factors" that reduce performance "in some cases to zero."

Newer ship systems seek to spot missiles faster while reducing the number of false alarms. One way is to meld data from various types of radars aboard the ship. Such a system can produce multiple detections within the scan time of a single radar. Similarly, by using integrated radars with different characteristics, authentic targets can be winnowed from spurious signals because a spurious signal on one radar is often not spurious in the electronic eye of another.

Technology Business

Computer Nets Track Air Express Packages

By Paul Kemezis

SAN FRANCISCO — The overnight air express business, which exploded in the United States in the early 1980s and rapidly spread to Europe, is now undergoing a major technological revolution. Led by industry pioneer Federal Express, air express companies are starting to use sophisticated optical readers and computer networks to track packages as they move from pickup to delivery around the world.

This lets companies give customers up-to-the-minute information on where packages are and, for international deliveries, helps them ease customs bottlenecks. Such services are a key marketing advantage in the \$6-billion-a-year business, which is reaching a saturation point in the United States after a period of fast growth and faces new competition from cheap electronic facsimile technology.

According to Paul Losch, director of marketing for DHL in Redwood City, California, a leading player in the international air express market, "tracking has become one of the three essentials of this business along with reliability and coverage."

No one disputes that Memphis-based Fed-

eral Express, under its chairman, Frederick W. Smith, has the most impressive tracking technology of any express company. The push by rival companies to copy parts of the Fed Ex system proves it is doing something right.

Fed Ex started the revolution in 1984 by introducing its "SuperTracker." This handheld computer, designed by Fed Ex itself and manufactured by specialty electronics companies, reads bar codes from packages and key-punched information from the Fed Ex agent and relays data via optical signals to small data terminals.

The remote terminals are in real-time communication with the company's central data bank in Memphis. From Memphis, the data is available for telephone operators in 14 regional centers to answer the about 16,000 customer calls a day on the status of packages. Also, the tracking data can be called up on 22,000 terminals at Fed Ex stations.

Fed Ex first installed the SuperTrackers at pickup and delivery stations and at its domestic sorting hub in Memphis, which handles up to 800,000 packages each night. It is now completing a program to put a SuperTracker in the hands of all of its 44,000 couriers in the United States. Also, each of its 15,000 delivery vans is being equipped with a mobile radio terminal that can transmit all data punched into the SuperTracker via relays at the local Fed Ex offices to the Memphis data bank.

In all, by early 1988, Fed Ex plans to have



The FedEx SuperTracker.

each package logged into the network seven times as it moves from the sender to the receiver.

The package-tracking function is one part of a Fed Ex system called COSMOS (Customer Operations Service Master On-Line System). Using COSMOS, Fed Ex operators can also flash on computer screens in the vans information on just-phoned-in requests for pickup, giving Fed Ex couriers an advantage in catering to customer needs. COSMOS also cuts routing mistakes, allowing Fed Ex to stick to its guaranteed overnight delivery deadline of 10:20 A.M. in most urban areas, and even informs couriers to refuse pickups if customers have bad debt records.

Other express companies respect the Fed Ex technology achievement but some say it may be overkill. United Parcel Service, fast becoming Fed Ex's main rival in the United States, has a less powerful tracking system that logs when express packages move in and out of 1,300 local stations but not at customer premises.

Ken Stern, an UPS spokesman, said, "We don't think Fed Ex has that much of a market advantage. Our customers basically want to know if a package has arrived, not where it is along the route."

DESPITE the tough talk on tracking, UPS is clearly hindered by the lack of on-demand pickup and is believed to be close to adopting technology like that of Fed Ex to give its drivers the same flexibility. Another major player, Airborne Freight Co., does have an on-demand capability but does not extend coverage outside urban areas, reducing its technology needs.

DHL's Mr. Losch, with a major international business, agrees with UPS that pinpoint tracking is not absolutely necessary. He said, "Usually, when a package is being delivered in Paris, the person who sent it from San Francisco is asleep."

Because of the restrictive European data communications environment and its smaller size there, Fed Ex has been slower to introduce its U.S.-style tracking system, although it promises eventually to give a near equivalent of U.S. service. This means all major companies are at about the same stage of technology development.

But a key competitive problem in the international express business is customs, since it is often the main obstacle to providing prompt service. All major express companies say they are now applying their package-tracking systems to speed items through customs points.

Using data gathered at the pickup stage, the companies supply customs agents with computerized lists of items in advance. The agents can preselect what they want to inspect, allowing the rest to pass faster or even signal ahead if documents are out of order. "If we are told six hours ahead that some customs information is missing, we can correct the problem while the package is still in the air," Mr. Stern says.

PAUL KEMEZIS writes about telecommunications for McGraw Hill in San Francisco.

Race Is on for 21st-Century TV

By Jacques Neher

PARIS — In the race to develop cinema-quality television for the 1990s, European and Japanese companies are vying to set the worldwide standards they believe will assure their technology's dominance in the marketplace.

Already propelled by a major thrust under Eureca, Europe's research and development program, the major European companies involved got an extra boost in late November, when the United Nations broadcast standards organization, the CCIR, gave its first recognition to the European technology.

The technology is known as HDTV, for high-definition television. Both sides are at work on prototype equipment. HD-MAC in Europe and MUSE in Japan, to demonstrate to the CCIR, which is expected to decide the standards issue by 1990. Full implementation is not expected before 1995.

Although all sides say a single worldwide standard would be ideal, they are not counting on it. More likely, they say, conflicting economic and political interests will force the broadcast industry to work with two or even three technological standards — one for Japan, a second for Europe and possibly a third for the United States.

At stake for consumers is the possibility of watching programs generated anywhere in the world on larger, wide-screen sets, with cinema-quality picture and compact disc-quality sound.

"We've known the Stone Age, we've known the Bronze Age, and we now enter the Silicon Age," Cornelis J. van der Klugt, chairman of Europe's consumer electronics giant, Philips of the Netherlands, said recently in Paris. "HDTV is a milestone in the way we go into the silicon age."

For Mr. van der Klugt, the European idea for HDTV implies "a very good picture, much better than we have today. There will be 24 hours of information around the world. Press a button and you can see a golf game in the United States or sumo fight in Tokyo or a concert in London, or in Berlin or Paris."

Such programming possibilities, he argues, will be more easily achievable if the European concept for HDTV is chosen as the world's standard.

Even more important for companies like Philips and France's Thomson SA is the chance to roll back Japan's dominance in the world consumer electronics industry. By setting the standard, the Europeans would be able to earn royalties off technology that will give birth to an entirely new product category.

At issue, ultimately, is the replacement of the world's 600 million television sets, plus a good chunk of its TV studio and broadcast equipment.

A more fundamental criticism lodged by the Europeans is that the Japanese concept would force production studios, broadcasters and consumers throughout the world to replace their current equipment in order to make, send and receive the new high-definition television images.

"We call it the '600-million-TV-sets-in-the-

garbage' option," Mr. Caillot said of the Japanese HDTV concept.

Mr. Caillot said the European technology could be phased in gradually while it remained compatible with present-day equipment. Mr. Caillot compares it with the phase-in of color TV broadcasting over the past few decades, in that the color signal could still produce a monochrome image for those who owned black-and-white sets, while a monochrome signal could be received by those who had bought color sets.

Aside from doubling the number of lines, the HD-MAC technology proposes to sharpen the TV image by radically changing the way the signal is generated.

In Japan's MUSE system, as in present-day television, the moving image would be formed by interlacing, whereby a frame of a moving subject is broken into two fields, or image samples. The fields are projected on the screen, one following the other at 1/50th of a second, but at alternate lines. The difference between these image fields produces the illusion of motion.

Thus, the Japanese system would boost the amount of lines, from 525 to 1,125, but still use only half of them for each image field.

In contrast, HD-MAC's technology proposes to scan the TV image by radically changing the way the signal is generated.

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The HD-MAC system would double the current European PAL/SECAM standard of 625 lines to 1,250 lines for European broadcasters and would double the Japanese U.S. standard from 525 lines to 1,050 lines.

From the viewer's standpoint, all would

At issue is the replacement of the world's 600 million TV sets.

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The HD-MAC system's

ures'
Radar
ems Work

NOTEBOOK

'Paper' Battery

OKYO — Two Japanese companies have succeeded in producing electrolyte, the chemical mixture inside batteries, in paper form, allowing the manufacture of batteries less than 0.1 millimeter (0.004 inches) thick.

Matsushita Electric Industrial Co. says batteries made from the sheets of rechargeable dry electrolyte could be used to power "smart" credit cards with built-in computer chips, smaller heart pacemakers and miniature portable radios and tape recorders.

Matsushita, which jointly developed the sheet electrolyte with Japan Synthetic Rubber Co., still is studying what kind of metal electrodes will work best with it. As a result, the company says batteries with the sheets will not be available commercially for at least one to two years.

(AP)



Scientists monitor microbiology outside tomb to measure impact of visitors.

Speedier Chip

SAN FRANCISCO — The Pentagon is pushing suppliers toward gallium arsenide integrated circuits, combining many components into a single chip that can be reliably mass-produced. Such circuits are known as monolithic microwave integrated circuits, or MMICs.

"The analogy is the same as where silicon was 20 to 25 years ago — the government is underwriting all the development," said Donald A. Bond, president of Pacific Monolithics, of Sunnyvale, Calif. The company makes microwave gallium arsenide chips. Gallium arsenide potentially offers far greater speed with greater resistance to heat and radiation than the silicon normally used to make electronic circuits, but the cost and difficulty of working with it have scared most chip users away.

The military hopes that gallium arsenide integrated circuits will allow sophisticated radar systems — now the size of buildings — to be made small enough to fit into planes. A tiny radar-on-a-chip could also be used in shells to help them home in on their targets.

The Pentagon program could have civilian spinoffs, according to Pacific Monolithics, which has built the first mass-market MMIC, a chip for use in satellite television receivers. The chips could be used in collision-avoidance systems for cars, or in satellite communications systems that will allow a car or a truck to determine its location.

(NYT)

Bright Prospects

Potential military markets for gallium arsenide in millions of dollars.

—800
—600
—400
—200
0
'86 '87 '88 '89 '90 '91

Source: Triquest Semiconductor Inc.



Conservator takes color readings on wall paintings to detect changes.

John A. At

Technology

Man, Machines Restore Measure of Life

Continued from page 7

Mr. Monreal had worked on Egyptian archaeological sites in the 1960s and had been involved in the reorganization of the Egyptian Museum in the 1970s. No one was in a better position to respond to the call for help from Mr. Kadry.

The two men got the Nefertari conservation project started in September 1986, less than 15 months after Mr. Monreal's appointment, something of a speed record for this type of undertaking.

In the meantime, what is to this date the most advanced conservation laboratory had been set up. It was running under the scientific direction of Frank Preusser, one of the top men in the field of scientific conservation who had been lured away from the Dörner Institute in Munich.

Mr. Preusser has a keen visual understanding of art and does not allow technology to run out of bounds against common sense. He established a sound relationship with Italy's leading fresco restorer, Paolo Mora of Rome, who had been called in to wield the tools and personally control every physical treatment of the painted surface.

What Mr. Preusser set out to do, as it appears in retrospect, was to give Mr. Mora assurances that whatever the restorer would be doing would be compatible with the environment of the tomb and the physical characteristics of the paintings. This meant providing the restorers with scientific data on an unprecedented level of sophistication.

Directed by Mr. Preusser, a team including Egyptian and Western scientists analyzed the materials used to execute the wall paintings, which include the pigments, the plaster coating and the binding medium. For pigments, the team used X-ray diffraction. The diffractometer made available by the Getty Conservation Institute is a technical development that is barely five or six years old.

In the past, if scientists wanted to analyze minute, i.e. sub-milligram fragments, they would resort to diffraction cameras recording the results on film. The position-sensitive detector used in the tomb made it possible to abandon the old manual system of data acquisition and evaluation in favor of a computerized system. It allowed incomparably higher speed and comprehensive coverage. The composition of the plaster, of the pigments and the nature of the salt that is coming out of the rock and is the main cause of deterioration were studied as never before on any site.

The attention of the Getty team was focused particularly on the salt. The highly sophisticated equipment of the Conservation Institute at Marina del Rey in California includes an electron-beam microprobe — a scanning electron microscope using electrons instead of visible



Inside the tomb's funerary chamber, workers prepare surfaces for the next phase of restoration.

believes that the Egyptian blue of the tomb ceiling has turned black in some areas, possibly as a result of micro-organisms. Minutiae fungi from the Nefertari tomb have been grown in a Tokyo laboratory to further verify the hypothesis.

Having collected these data from September 1986 to April 1987, the Getty Conservation Institute started the treatment phase at once. To consolidate fragments of plaster in imminent danger of falling off as a result of vibrations caused by tourist traffic, a light concentration of an acrylic consolidant has been applied on the back of each flaking fragment.

The larger pieces have been fixed with thin strips of Japanese paper, 10 by 2 centimeters (3.8 by 7.8 inches), which make some of the walls look as if they had been covered with Band-Aids, a harmless process light years ahead of the thick gauze applied with organic glue over the paintings in the late 1960s. Mr. Mora's team has now succeeded in removing the gauze with no loss at all.

Mr. Monreal estimates that in two years the restoration work should be completed. Thus, at a cost that is minimal compared with the overall Paul Getty Trust budget, one of the most remarkable artistic undertakings since World War II is being carried out.

This is a vital indication that the restorers will be in no danger of seeing their work jeopardized in the event of a catastrophic rainfall in 10, 20 or 50 years.

The biological survey undertaken by a Japanese biologist, Hideo Arai, revealed

"a surprisingly dry environment." He believes that the salt that is coming out of the rock and is the main cause of deterioration, was the result of periodic rainfalls. These were thought to have taken place at very wide intervals, perhaps 100 years or more.

"When we studied the salt under the electron-beam microscope, I expected,

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دعا من العجل

Pick of J

Restored Temple
Opens in Athens

DOONESBURY



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ARTS / LEISURE

Chaumet's New Looks

International Herald Tribune

PARIS — Things are brewing on the Place Vendôme. Since the financial collapse last June of the Chaumet jewelry firm (founded in 1780), the company has been bought by a Bahrain-based company, Investcorp, the Arabian Investment Banking Corp., an international investment bank whose total assets in 1986 were \$416.5 million. Investcorp paid between \$13 million

HEBE DORSEY

lion and \$14.7 million for Chaumet, an august house that moved from Faubourg Saint Honoré to Place Vendôme in 1802.

On Nov. 11, Investcorp hired Jean Bergeron away from the Comité Colbert and appointed him president of Chaumet and its parent company, Bréguet. For the last five years, Bergeron was the Comité Colbert director and its most active member when it came to promoting French history. The Comité Colbert groups 70 French luxury businesses, including jewelers, perfume and fashion houses, and the Ritz and Maxim's. Bergeron turned the Colbert from a classy but dormant group into an active organization that has held successful shows in Tokyo and Munich and is planning to expand in the United States with an exhibition at Washington's Smithsonian Institution.

Bergeron's new job will be a tough one. Chaumet, which had as its clients the French and international aristocracy since Napoleon, is definitely going through a tarnished period. But this does not seem to frighten either the investors or Bergeron.

Ellis N. Hallack, Investcorp's executive director, said: "If we didn't believe in Chaumet, we wouldn't have bought it. We're confident about the future. We have to keep the traditional lines



Dionysos: One of Chaumet's "Nouveaux Regards;" the terra cotta head is Greek, fourth to second century B.C., the garland and neck ornament are in modern gold and diamonds.

while developing other new ones. We're not ready yet, but give us time. Six months, maybe a year."

Hallack added that Investcorp's policy is to buy companies, give them all the support they need but not interfere in the way they are doing business.

Bergeron already had a chance to show he has both guis and vision. On Dec. 8, when the Place Vendôme retailers had a big cocktail party, Bergeron did not hide, despite the fact that Chaumet had just

been expelled from the Comité Colbert. Instead, he had the best-decorated store on the square, covered in festive Christmas ivy and red ribbons. He also entertained about 2,400 guests "including old clients who were very happy to see us there," he said. Bergeron also organized a handsome display called "Nouveaux Regards," of objects mixing precious materials with century-old antiques in the store's salon.

Bergeron was not keen to talk about Pierre and Jacques Chaumet, released Friday from preventive detention after reportedly being indicted in connection with Chaumet's collapse. He was looking ahead, and his attitude was upbeat. "My first job will be to give work to the workrooms, whose 25 employees have been a bit depressed lately. We must be able to meet the demand, which is most acute during the Christmas season."

A media-oriented man, Bergeron has been giving extensive interviews to one and all "to take advantage of the surprise effect brought in by my appointment. We have to re-establish Chaumet's image, then enlarge the line of products so that they will be more accessible to a wider public."

"I'm taking over a new, clean, debt-free business," he added. "It's a formidable challenge but I hope to bring Chaumet back to its former splendor and into the Comité Colbert."

Fighting words, but they raise a bigger question than simply that of restoring the good name of a prestigious house. The takeover of Chaumet is but one in a whole line of small and medium-size French family businesses merging with international investment companies.

The fear is that, in the process of corporate money's expansion and exploitation of a famous name, the products on which the fame of that name rests may suffer, and stan-



Jean Bergeron: A tough job.

dards of excellence be lost or downgraded.

Recently Hermès announced the creation of a new company in 50-50 partnership with the Japanese cosmetics firm Shiseido, to distribute Hermès perfume in Japan and to market new products in Southeast Asia. But any such products, said Hermès President Jean-Louis Dumas-Hermès, will be quality-controlled from Paris. The merger of Vuitton with Moët-Hennessy and the leadership of President Henry Racamier have transformed a small family concern into a flourishing

multinational, indeed the largest luxury business in the world, so far without any apparent loss of quality.

And Tiffany's, also partly owned by Investcorp, has regained some of its old lustre, lost during the period of Avon ownership, when it strayed too far into kitsch gimmickry. So, big money need not necessarily cheapen the small, elite firm's name; but there is always a danger, and it would be particularly tragic if Chaumet's financial recovery should be at the cost of its very special historic cachet.

al city of the year," should make that clear.

BERLIN — The twin villages of Berlin and Koelln had long existed on opposite islands in the Spree River of Brandenburg's watery world when their existence was first fixed in a document dating from 1237. But 750 years is still worth celebrating and so — starting in April with the world premiere of a "Berlin" musical derived from E.T.A. Hoffmann's Schlemihl figure — no less than 18 works commissioned for the occasion have had their first performances, supplemented by visits of opera companies from Kiev, Milan, Vienna, Munich, Hannover and Kassel, drama companies from France, Austria, Israel and Hungary and dance companies from New York and London.

One of the outstanding events was the world premiere of Wolfgang Rihm's opera "Oedipus." Commissioned by the West Berlin's Deutsche Oper, "Oedipus" was unveiled in the glare of a live nationwide TV and radio broadcast, which did the powerful but intimate work no good.

Rihm pieced his own non-sequitur libretto together with fragments from Nietzsche, Heiner Müller and Sophocles' drama as translated by Hölderlin, relying on the harsh acerbic sounds of his stringless orchestra — used "like a weapon or a scalpel" — alternating with quiet, floating vocalism, to convey the archetypal power of the myth. After an hour and a half of such battering on opening night Oct. 4, one listener shouted "unbearable" into the stunned silence that followed Oedipus' self-blinding and banishment. Then the Deutsche Oper left for Yokohama and Tokyo to perform three triumphantly received "Ring" cycles.

It was not certain that "Oedipus" had been heard to best advantage at the premiere, which had to accommodate the television cameras, and the performance on Dec. 6 reinforced that feeling. Marvelous details emerged in Götz Friedrich's staging, set in Andreas Reinhard's modern, pyramid-like designs, revealing Rihm's "Oedipus" one of the most brilliant productions in West Berlin's repertoire.

Andreas Schmidt in the title role and Emily Golden as his wife-mother Jocasta created unforgettable stage figures, supported by William Tell, William Dooley, Lenus Carlson and William Murray as Creon, Tiresias, the Messenger and the Shepherd. Christof Perich conducted, aided by some stunning light effects which had to be left out because the TV cameras could not register them. Is "Oedipus" a modern masterpiece? Performances scheduled for March 1988, with Berlin declared "cultural capital of the year," should make that clear.

Doris Soffel (who had been his

sandra in "Troades"), Manfred Trojahn's celebration of silence with a large orchestra and huge percussion section in "Cinq Epigraphes" (the Cleveland Orchestra will premiere his Orchestral Variations this season), and the South Korean composer Isang Yun's Fifth Symphony, for the baritone Dietrich Fischer-Dieskau and the Berlin Philharmonic.

Yun, now a German citizen and professor of composition at the Berlin Musikhochschule, was abducted by his own country's secret police from Berlin in the mid-'60s, imprisoned for two years and only released after a worldwide protest.

Each of his five symphonies, a series he began composing in 1982, deals with a different problem of contemporary life as seen through the composer's eyes and his Taoist philosophy. Dedicated to the memory of the German-Jewish poetess Nelly Sachs, the Fifth Symphony uses material from 11 of her poems to create five movements.

Yun's dense textures, constantly undulating through apparently motionless clusters of sound using tone centers rather than keys, shimmer with exotic instrumental effects that immediately identify the music as his. Trills, gissandi in strings and trombones, woodwind shakes, form the substance rather than decorative elements in his incandescent music. Fischer-Dieskau intoned the syllabic poetic settings with his customary authority. The 55-minute work, an important addition to the repertoire, was sensitively premiered by the conductor Hans Zender.

James Helme Stucke is a Berlin-based critic and musician.

New Rihm, Yun Works Highlight Berlin Fête

By James Helme Stucke

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Thomas S. Monaghan, chairman of Domino's Pizza Inc. of Ann Arbor, Michigan, and owner of the Detroit Tigers baseball team, Monaghan is a top collector of Wright furniture who has paid record prices for many pieces, most of which are installed at his Center for the Study of Frank Lloyd Wright.

By the end of the session, the governor had bought five lots — a music stand, a leaded glass and bronze table lamp, and three architectural drawings, and Monaghan had acquired 23 of Wright's designs for \$431,640. The singer-actress Barbra Streisand purchased two of the most expensive works in the auction by Wright — both were made for Illinois houses — through the New York dealer Michael Carey. She paid \$176,000 for an oak library table from the B. Harley Bradley house and \$77,000 for an oak console table from the Avery Coonley house of 1908. The one item for which Monaghan paid more (\$10,450) than Christie's expected was an angular boxy pet house that Wright or a member of his staff made in 1934.

Frank Lloyd Wright Items Auctioned

By New York Times Service

NEW YORK — Governor James R. Thompson of Illinois got a

bargain of sorts this weekend by spending \$330,000 — less than half

of what he'd planned — to buy Frank Lloyd Wright furniture and architectural drawings at Christie's auction house in Manhattan.

He acquired the items for a state-owned restoration, the Dana-Thomas house in Springfield, Illinois. He had come to the auction with pledges of more than \$600,000 in private funds.

He sat next to the man everyone thought would be his major opponent

Thomas S. Monaghan, chairman of Domino's Pizza Inc. of Ann Arbor, Michigan, and owner of the Detroit Tigers baseball team, Monaghan is a top collector of Wright furniture who has paid record prices for many pieces, most of which are installed at his Center for the Study of Frank Lloyd Wright.

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Pick of Jazz and Pop Records for Christmas

By Mike Zwerin
International Herald Tribune

HERE is one critic's holiday shopping list for jazz and pop records:

IRAKERE, "Misa Negra" (Mesidor): The surprise of the year. An independent West German label records a Cuban band in Ludwigshafen. Shades of Dizzy Gillespie, Eddie Palmieri, Gato Barbieri, Cecil Taylor, Machito and (the Cuban composer) Leo Bruna. The title suite by Chucho Valdés is about the Yoruba religion in Cuba today and features the Stanisar Synthesizer strings. Check out Chucho's soaring arrangement and pumping piano, in his own place between Ellington and Oscar Peterson, on Dave Brubeck's "El Duke." And if you think this is good, wait until you hear Gonzalo Rubalcaba's neo-hop Afro-Cuban band.

MARIANNE FAITHFULL, "Strange Weather" (Island): The composer of "Sister Morphine" is alive and, if not exactly well, living from day to day in Boston. Swing

London's prima survivor, the Diva of Despair, should be cheered-up by her high-quality autobiographical collection of sad songs such as "Boulevard of Broken Dreams," "Yesterdays" and "As Tears Go By." Faithfull's tough yet fragile voice is reminiscent of Lotte Lenya, Edith Piaf and sometimes Billie Holiday. It's a fine good morning heartache.

WYNTON MARSALIS, "Standard Time" (CBS): The late classical pianist Artur Schnabel advocated feeling over technique. "Safety last" was his motto, and he told his students that accuracy was a negative virtue "like not stealing silver spoons." Helped by an elastic, adventurous young rhythm section, the jazz trumpet prodigy Marsalis takes standard repertoire ("Caravan") into astonishing places. He has begun to tame his prodigious once accuracy-first technique and you better look out before he steals all the silver.

CHRIS REA, "Dancing With Strangers" (Magnet): Mellow, foggy Celtic rock, serious without being itself too seriously. This poetic British songwriter/singer is always on the edge of irony, if not cynicism. He is "choked on the sword of no return," buys a hat to protect himself from the fallout of "all them leaders' desperation in their eyes" and warns us may we "all go insane" because "it takes too long to explain the joys of Christmas."

EDDY LOUSS, "Sang Mâle" (Nocturne): One of the first French jazzmen to be in demand by Americans (Stan Getz, Quincy Jones, Kenny Clarke), the organist Louss, now on his own road, has become a superb synthesist, a rare recognizable personality on electronic keyboards. The title, which means "mixed blood," is an accurate verbalization of this mélange of his Martinique background, quiet at "New Age" textures and, above all, the blues.

GEORGE HARRISON, "Cloud Nine" (Dark Horse/WEA): Accompanied by, among others, Eric

Clapton, Elton John and Ringo Starr, the Third Beatle is "helping us all to remember what we came here for." His long-awaited new album might sound a touch too familiar from time to time and too middle-of-the-road everywhere it is, but it is full of sweetness, light and positive thinking: "I'm not the wreck of the Hesperus, I feel more like the Wall of China."

TERENCE TRENT D'ARBY, "Introducing The Hardline According to . . ." (CBS): While Pat Cash, Henri Leconte and others were playing tournament tennis in South Africa, D'Arby canceled a concert in Vienna to protest Kurt Waldheim's presidency even though he assumed he'd be sued for it. Musically, he also goes further than expected. This 25-year-old Afro-American expatriate in London shakes up such influences as James Brown, Bob Marley, Otis Redding, Marvin Gaye, Sam Cooke, Rod Stewart, Prince and Stevie Wonder (yes, all of them) and comes out the other side of imitation into innovation.

LINDA RONSTADT, "Canciones de mi Padre" (Asylum): Heartfelt versions of buapangos, rancheros, corridos and other traditional Mexican songs that Ronstadt learned from her father, sung in Spanish with folky traditional acoustic accompaniment.

SONNY CLARK, "Cool Strutin'" (Blue Note): The late bebop piano legend, Clark is the closest rival Bud Powell ever had in his own generation. This reissue was recorded on Jan. 3, 1958, with Jackie McLean, alto; Art Farmer, trumpet;

pet; Paul Chambers, bass, and Philly Joe Jones, drums, and will no doubt still be popping fingers 30 years from now.

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Restored Temple Opens in Athens

The Associated Press

ATHENS — A 2,400-year-old temple on the Acropolis was reopened Sunday.

The \$2.3 million restoration of the Erechtheum, about 50 meters from the Parthenon, won praise from Culture Minister Melina Merkouri.

"Freedom of its scaffolding, it shines with beauty. After so many years, Greeks and foreigners can now approach it," the minister said.

Most of the scaffolding came down in the spring, but the temple, dedicated to the goddess Athena, remained roped off while restorers were still at work.

Most of the temples on the Acropolis, including the Parthenon, are undergoing restoration after being damaged by time, looting, pollution and carelessness restoration

DOONESBURY



NYSE Most Actives						
Vol.	High	Low	Last	Chg.	Per cent	
Schimb	2654	29	28	28	+1	+3%
VITACO	2155	34	33	33	+1	+3%
Novart	2674	49	48	48	+1	+2%
GenEl's	1925	45	45	45	+1	+2%
Exxon	1740	115	115	115	+1	+1%
BIA	1675	115	115	115	+1	+1%
SEFCorp	1545	45	45	45	+1	+2%
USX	1244	45	45	45	+1	+2%
Int'l Pos	1208	45	45	45	+1	+2%
AMEx	1204	25	25	25	+1	+4%
WMC	1204	25	25	25	+1	+4%

Market Sales						
Vol.	High	Low	Last	Chg.	Per cent	
NYSE 4.4m. units	167,490,000					
NYSE 4.4m. cons. close	12,180,000					
Amex 4.4m. units	11,420,000					
Amex prev. cons. close	10,440,000					
OTC 4.4m. volume	118,027,500					
OTC 4.4m. volume up	150,073,700					
NYSE volume down	2,268,200					
Amex volume down	1,973,720					
OTC volume up	19,484,112					

NYSE Index					
High	Low	Close	Chg.	Per cent	
Composite	132.26	132.26	+1.27	+1.27	+1%
Industrials	132.26	132.26	+1.27	+1.27	+1%
Transport	132.26	132.26	+1.27	+1.27	+1%
Utilities	107.84	107.84	+1.43	+1.43	+1%
Finance	107.84	107.84	+1.43	+1.43	+1%

Mondays NYSE Closing

Via The Associated Press

AMEX Diary					
Close	Prev.	Chg.	Per cent	Adv.	Decl.
Composite	309.26	+6.77	+2.2%	332.22	295
Materials	309.26	+6.77	+2.2%	332.22	295
Finance	309.26	+6.77	+2.2%	332.22	295
Banks	309.26	+6.77	+2.2%	332.22	295
Transport	309.26	+6.77	+2.2%	332.22	295
Utilities	309.26	+6.77	+2.2%	332.22	295
Hotels	309.26	+6.77	+2.2%	332.22	295
Impex	309.26	+6.77	+2.2%	332.22	295
ICL	309.26	+6.77	+2.2%	332.22	295
PAUL	309.26	+6.77	+2.2%	332.22	295
Crucible	309.26	+6.77	+2.2%	332.22	295
BHP	309.26	+6.77	+2.2%	332.22	295

NASDAQ Index					
Close	Chg.	Per cent	Week	Year	Avg.
Composite	309.26	+6.77	+2.2%	332.22	295
Materials	309.26	+6.77	+2.2%	332.22	295
Finance	309.26	+6.77	+2.2%	332.22	295
Banks	309.26	+6.77	+2.2%	332.22	295
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BHP	309.26	+6.77	+2.2%	332.22	295

AMEX Most Actives						
Vol.	High	Low	Last	Chg.	Per cent	
ECHO	6,511	250	249	249	+1	+0.4%
GCR	2,228	130	129	129	+1	+0.8%
WDRL	2,174	100	99	99	+1	+1.0%
TRST	2,071	100	99	99	+1	+1.0%
NY Times	2,071	314	304	304	+1	+0.3%
After	2,071	314	304	304	+1	+0.3%
Impex	1,671	42	41	41	+1	+2.4%
Honda	1,623	33	32	32	+1	+3.1%
AMER	1,623	33	32	32	+1	+3.1%
ICL	1,623	77	76	76	+1	+1.3%
PAUL	1,623	77	76	76	+1	+1.3%
Crucible	1,623	77	76	76	+1	+1.3%
BHP	1,623	77	76	76	+1	+1.3%

NYSE Diary					
Close	Prev.	Chg.	Per cent	Bonds	Utilities
Advanced	127.41	-2.07	-1.6%	129.50	-0.25
Declined	375	-2.07	-0.6%	375	-0.25
Unchanged	318	-2.07	-0.6%	318	-0.25
Total Issues	2,000	-2.07	-0.1%	2,000	-0.25
New Highs	3	-2.07	-6.7%	2	-0.25
New Lows	56	-2.07	-3.5%	56	-0.25

Odd-Lot Trading in N.Y.					
Close	Prev.	Buy	Sales	Chg.	Per cent
Dec. 11	273.19	470,077	3,804	+1.27	+0.4%
Dec. 10	273.19	470,077	3,804	+1.27	+0.4%
Dec. 9	269.92	282,297	2,201	+1.27	+0.4%
Dec. 8	269.92	265,162	9,877	+1.27	+0.4%
Dec. 7	263,440	279,479	12,012	+1.27	+0.4%

Tables include the nationwide prices up to the closing on Wall Street and do not reflect late trades elsewhere.

Dow Jones Averages					
Open	High	Low	Last	Chg.	Per cent
Industrials	279.82</td				

Steel Loss Depresses Thyssen Profit

Reuters

DUSSELDORF — Thyssen AG, the West German industrial group, reported Monday that world group net profit fell 18 percent to 302 million Deutsche marks (\$185.1 million) in the year ended Sept. 30, from 370.1 million DM a year earlier.

It said that world group revenue on sales to entities outside the group fell 17 percent to 26.6 billion DM, from 32 billion, mainly because of currency fluctuations.

Thyssen said Monday that Thyssen Stahl's results had deteriorated

Revenue from steel operations fell 16 percent, to 8.9 billion DM from 10.6 billion.

Thyssen said it planned to pay a dividend of 5 DM, unchanged from the previous year, despite anticipated heavy losses from steel.

Thyssen said a year ago that it expected its steel subsidiary, Thyssen Stahl AG, to post a loss for 1986-87 after a group net profit of 126 million DM in 1985-86.

Thyssen said Monday that Thyssen Stahl's results had deteriorated

sharply, but gave no figures. Thyssen Stahl is expected to issue its results later this week.

Lower steel prices caused steel revenue to drop, Thyssen said, and profit in some areas of the steel sector were not enough to cancel out losses from sheet iron and rod, wire and section steel.

Thyssen's three other main activities — specialty steel, trading and services, and engineering and processing — reported higher profits for the year despite lower revenue, Thyssen said. It provided no details.

Thyssen said its management board was confident about the coming business year despite global economic problems. The company is still aiming to concentrate on promising areas such as services and manufacturing, it said.

Thyssen's fixed-asset investment stood at 1.2 billion DM, down from 1.5 billion DM a year earlier.

Thyssen said its work force had shrunk in the past year in line with cutbacks in the steel industry, standing at 121,533 on Sept. 30, down from 127,683 a year earlier.

In November, Thyssen announced plans to cooperate on production with two other West German steelmakers, Fried. Krupp GmbH and Mannesmann AG, to cut costs in the face of what they called unfair foreign competition.

Officials said all three would shed staff in the operation. GAF's stock, which was trading at more than \$60 a share before the market collapse in October, closed Monday at \$44.25, down 75 cents.

The share had traded as low as \$35 after the market collapse, and GAF said on Oct. 21 it would buy back up to 21 percent of its common shares.

conditions and the rise in interest rates, which would make financing more expensive.

The original bid had valued the company at \$2.23 billion. Wall Street arbitragers said the revised proposal was difficult to value because the debt portion of the offer had not been fully disclosed.

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CANADA: Citing Threat to Jobs, Patriot Publisher Fights U.S. Trade Pact

(Continued from first finance page) Canada at 16, fleeing pogroms in the Ukraine.

After high school, Mr. Hurtig worked as a truck driver, then switched to a job as a clerk in a family-owned fur store. In 1955, at 24, he quit the job, borrowed \$3,500 from his father and indulged his love of reading by opening Edmonton's first independent bookstore.

His book business grew with the oil boom sweeping Alberta and expanded within a decade to three stores. Along the way, Mr. Hurtig took advantage of the books to complete his education.

In 1965, browsing through the political section, he came across "Lament for a Nation," by a Canadian academic, George Grant. The book resonated a sense of nationalism among many Canadians of the postwar generation. It argued that Canada, for want of strong national direction, was becoming an outpost of the American empire.

Later, as Mr. Hurtig traveled — first across Canada, then to Europe and beyond — what he saw confirmed the thesis of the Grant book: that Canada would have to be more assertive, particularly

against the United States, if it wanted to preserve its nationhood.

The bellwether commonly cited is the extent of U.S. ownership of Canadian businesses. The figures are in dispute. Recent government statistics say that Americans owned 27 percent of the equity in nonfinancial Canadian businesses in 1960 and 23 percent in 1983. Mr. Hurtig's coalition against free trade says that 36 percent of those businesses were American-owned by the end of the 1960s, compared with 43 percent now.

The more I learned, the more I realized, first, how lucky we Canadians were to live here, and, second, how badly we were screwing up in the way we were running the country," Mr. Hurtig said in an interview before his parliamentary appearance. "And that's when I became interested in politics, not just reading about it but actually doing something to help preserve the Canada I love."

In 1972, Mr. Hurtig sold the bookstores and founded Hurtig Publishers, the first major English-language publishing house in Canada outside Toronto. It focused on Canadian books. Its volumes dealing with Alberta's natural history,

with Canada's role in World War I and with Canadian painting, among others, were best-sellers.

But the venture that secured the company's future was the publication in 1985 of a three-volume Canadian Encyclopedia, the first such reference work devoted to Canadian subjects. Hurtig Publishers invested more than \$8 million in the project, an unheard of figure for a Canadian publisher; Mr. Hurtig risked everything he owned.

The risk paid off: With total sales of 155,000 sets, the encyclopedia became Canada's greatest publishing success and made Mr. Hurtig a multimillionaire. The government honored him with the Order of Canada, the country's highest civilian honor.

Such success established him as a national figure, with an influence that few private citizens in Canada attain. Much of that influence goes to a new nationalist organization, the Council of Canadians, founded in 1985.

With 7,000 members and an annual budget of \$230,000, the council has played a major role in organizing opposition to the trade pact. Mr. Hurtig is its honorary chairman.

As some of the country's top economists have discovered, this self-educated man can be a formidable opponent.

The publisher made an impressive display of his homework before the parliamentary committee, where he presented a paper crammed with statistics, many of them the product of fresh research.

A few days earlier, the panel had been dismayed when government witnesses admitted that Mr. Mulroney's forecast of 350,000 new jobs from free trade had not been based on scientific research. It was an opening tailor-made for Mr. Hurtig, who used government statistics to back his argument.

"In the period 1978-1984, Canadian-controlled companies, for every billion dollars [\$5766 million] in profits, created 5,765 new jobs," the Hurtig paper stated. "During the same period, for every billion dollars in profits, U.S.-controlled companies created 17 jobs."

The flurry of statistics has confused ordinary Canadians. Almost 50 percent of those questioned in a recent survey were unable to decide whether the trade pact would be good for Canada.

ADD SOMETHING SOLID TO YOUR PORTFOLIO. INVEST IN THE NEW GOLD BRITANNIA.

As long as man can remember, gold has been the standard of wealth.

It has been the best insurance against inflation and times of trouble.

More secure than empires, certainly more secure than paper.

And now there is a new, simple way to buy it.

The new Britannia coin contains one ounce (31.1035 grms) of pure gold.

It is guaranteed by the British Royal Mint, the oldest mint in the world.

It is available from all banks and brokers.

And there are three other coins, which contain half an ounce (15.55 grms), a quarter of an ounce (7.78 grms), and one tenth of an ounce (3.11 grms) of gold.

Their price, of course, is determined by the current price of gold.

Which, in the long term, has always risen.

The new Britannia from The Royal Mint.

THE ROYAL MINT



Nissan Expands U.K. Plant

Reuters

LONDON — Nissan Motor Co. is investing a further £216 million (\$395 million) in its car plant in northeast Britain. Nissan's chairman, Takashi Ishihara, said Monday.

He said Nissan's investment would enable its British subsidiary, Nissan Motor Manufacturing (U.K.) Ltd., to make Micra, a small new model, at a rate of 100,000 a year beginning in 1992. Nissan's Bluebird cars are already in production at the plant.

Mr. Ishihara said the new investment would bring the total invested at the plant to more than £600 million, the largest single direct Japanese investment in Europe. The company expects to hire a further 1,000 workers, raising the total at the plant to 3,500, he said.

About 60 percent of the Micras and 40 percent of the Bluebirds will be exported. This year the plant will produce 30,000 Bluebirds, with 50,000 planned for 1988. By 1992-93, overall production should be running at 200,000 to 300,000 cars, Mr. Ishihara said.

The British government has offered financial assistance of up to £25 million, he said. He asserted that the project would provide a significant contribution to Britain's trade balance.

Nissan is still discussing the Micra's specifications. "Obviously we want this new car to be as European as possible," Mr. Ishihara said.

JAL Sets Share Price at 13,400 Yen

Reuters

TOKYO — The government's 34.5 percent holding in Japan Air Lines Co. will be sold at 13,400 yen (\$105) a share, brokers underwriting the issue said Monday.

That price, about 3.5 percent below JAL's closing level Monday of 13,900 yen on the Tokyo Stock Exchange, could bring in as much as 640 billion yen.

Half the 48.1 million shares will be sold to the public Tuesday through Thursday. The other half is

already placed with financial institutions and companies affiliated with JAL.

Underwriting brokers said that institutions would ensure the success of the offering. But they said that individuals were likely to avoid it because of the recent decline in JAL's stock price.

Toshihide Sakamoto, vice president of equity trading at Salomon Brothers in Tokyo, said that institutions were not so concerned about short-term fluctuations.

Continental AG, Japan Firms To Form Joint Tire Venture

By Ferdinand Protszman

International Herald Tribune

FRANKFURT — Continental AG, the West German tire manufacturer, said Monday it had signed a letter of intent to establish a joint venture with Toyo Tire & Rubber Co. and Yokohama Rubber Co. to produce tires in Japan and the United States.

Industry analysts said that the moves fit in with Hanover-based Continental's plans to consolidate its competitive position after an aggressive expansion into overseas markets.

Continental, which changed its name from Continental Gummi-Werke AG in July, had group sales of 3.5 billion Deutsche marks (\$2.14 billion) in the first nine months of 1987, up 1 percent from a year earlier.

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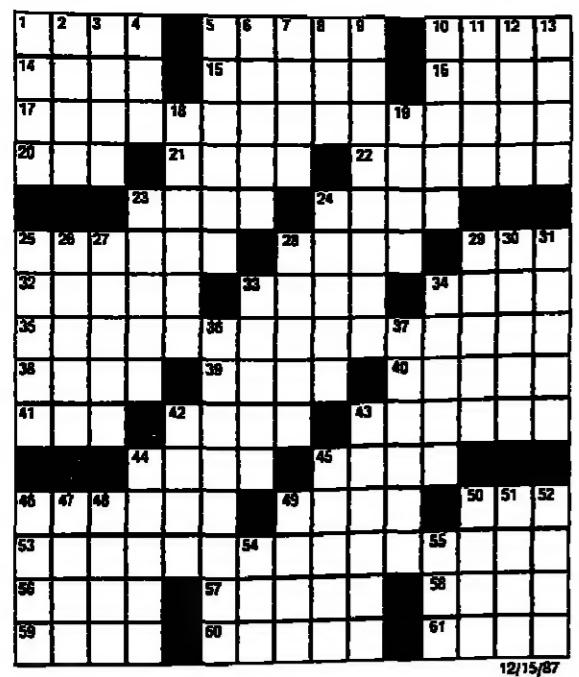
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PEANUTS



BLONDIE



BEETLE BAILEY



ANDY CAPP



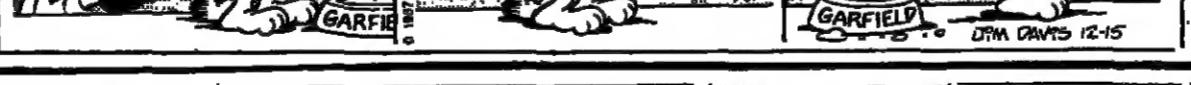
WIZARD of ID



REX MORGAN



GARFIELD



JUMBLE

THAT SCRABBLE WORD GAME

by Henri Arnold and Bob Lee

Unscramble these four Jumbles, one letter to each square, to form four ordinary words.

RADOH

ZIPER

INSENG

PASHIM

Now arrange the circled letters to form the surprise answer, as suggested by the above cartoon.

Answer: THEY

OUR

(Answers tomorrow)

Yesterday's Jumble: DRYLY, BATH, SIZZLE, COUPLE

Answer: What that first telephone conversation was — A CLOSE CALL

WEATHER

EUROPE

HIGH

LOW

ASIA

HIGH

LOW

AFRICA

LATIN AMERICA

NORTH AMERICA

FRASER

MIDDLE EAST

OCEANIA

TUESDAY'S FORECAST

CHANNEL: 4

FRANKFURT: Rain, Temp. 14-10 (50-50).

MADRID: Rain, Temp. 14-10 (50-50).

PARIS: Rain, Temp. 14-10 (50-50).

LONDON: Rain, Temp. 14-10 (50-50).

DUBLIN: Rain, Temp. 14-10 (50-50).

ZURICH: Overcast, Temp. 14-10 (50-50).

BANGKOK: Mostly

Sunny, Temp. 31-21 (80-70).

HONG KONG: Fine, Temp. 20-14 (60-50).

SEOUL: Rain, Temp. 20-14 (60-50).

TOKYO: Rain, Temp. 20-14 (60-50).

SINGAPORE: Thunderstorms, Temp. 20-14 (60-50).

Auckland: 22-22 (50-50).

Sydney: 23-23 (50-50).

c-light: for clouds; c-sh: for showers; c-dr: for drizzle.

c-overcast: for overcast; c-partly cloudy: for partly cloudy.

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SPORTS

Seahawks Tighten Race in AFC West

By Michael Wilbon

Washington Post Service

SEATTLE — Even though only two weeks remain before the National Football League playoffs, it wouldn't make sense for one of its teams to establish itself as the American Football Conference title favorite. It wouldn't make sense, in this season of little reason, for Denver to come into the Kingdom and put erratic, frantic Seattle out of its misery.

"As if the AFC wasn't confused enough already, the Seahawks added to the mess Sunday night, turning

the performance of a lifetime from quarterback Dave Krieg into a 28-26 victory over the Broncos.

Seattle's victory pushed its record to 8-5, tied with San Diego, a half-game behind Denver in the mad, mad AFC West.

Quarterback John Elway, who had taken the Broncos to four straight victories, turned a 10-0 halftime deficit into a tie early in the third quarter. But Krieg, who completed 23 of 33 for 235 yards and three touchdowns, tossed two short scoring passes thereafter — while Seahawk defense solved Elway.

Coming after two disappointing losses, the victory sends Seattle against the Bears in Chicago next Sunday with much needed momentum and hopes of wrapping up a wild card to the playoffs.

The Broncos did not surrender quietly. They drove 84 yards to get within a touchdown on Sammy Winder's two-yard run with 25 seconds left and then tried an onside kick. Seattle covered it.

But it had taken the Seahawks a while to get going. Curt Warner's 3-yard run capping a 10-play 55-yard drive for a 7-0 second-period lead. With time running out in the first half, Krieg sprinted up the middle for 17 yards before completing passes to Paul Skatzik and Daryl Turner to put the ball inside the Bronco 5. Krieg's three-yard pass to Ray Butler, with 22 seconds left, upped the lead to 14-0.

Denver revived in the third quarter. Winder went 11 yards for a touchdown, and a few plays later Krieg fumbled a snap at his own

5-yard line. Raiders 10: In San Diego, Pittsburgh overcame a 9-0 first-quarter deficit with a strong defense and rushing touchdowns by quarterback Mark Malone and Frank Pollard. The Chargers, in their fourth straight loss, committed five turnovers and Vince Abbott missed all three field-goal tries.

Cardinals 20, Giants 24: In St. Louis, Vai Sikahema scored on a 76-yard punt return and set up a second TD with a 49-yard kickoff return to help the 6-7 Cardinals remain in wild-card contention.

Lions 20, Buccaneers 16: In Tampa, Florida, linebacker Jimmy Smith set up 10 points with a 49-yard interception return and a deflected punt to help Detroit hand Tampa Bay its sixth straight loss.

Rams 33, Falcons 0: In Atlanta, California, league rushing leader Charles White carried 29 times for 159 yards and two touchdowns to power Los Angeles to its fifth straight victory. (UPI, AP)

SCOREBOARD

Football

Basketball

NFL Standings

AMERICAN CONFERENCE									
	W	L	T	Pct	PF	PA	GB		
Baltimore	7	6	1	.538	254	225	1/2		
Buffalo	7	6	1	.538	229	270	1/2		
Denver	8	5	2	.625	287	276	1/2		
Green Bay	8	5	2	.625	244	246	1/2		
Houston	9	4	1	.700	271	272	1/2		
Indians	7	6	1	.538	254	273	1/2		
Kansas City	3	10	2	.231	215	248	2		
Los Angeles	1	10	3	.083	215	248	3		
Minnesota	8	5	1	.625	233	224	1/2		
New England	10	3	2	.769	269	233	1/2		
New York Jets	4	7	1	.381	262	262	1/2		
NY. Giants	6	7	1	.462	262	262	1/2		
Philadelphia	7	6	1	.538	254	273	1/2		
Pittsburgh	9	4	1	.700	271	272	1/2		
Seattle	8	5	2	.625	254	273	1/2		
St. Louis	1	10	3	.083	215	248	3		
Tampa Bay	1	10	3	.083	215	248	3		
Washington	1	10	3	.083	215	248	3		
West	10	3	2	.769	269	233	1/2		
Winnipeg	1	10	3	.083	215	248	3		
W. Redskins	10	3	2	.769	269	233	1/2		
W. Vikings	1	10	3	.083	215	248	3		
W. Rams	1	10	3	.083	215	248	3		
W. Cowboys	1	10	3	.083	215	248	3		
W. Panthers	1	10	3	.083	215	248	3		
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W. Vikings	1	10	3	.083	215	248	3		
W. Rams	1	10	3	.083	215	248	3		
W. Cowboys	1	10	3	.083	215	248	3		
W. Panthers	1	10	3	.083	215	248	3		
W. Redskins	10	3	2	.769	269	233	1/2		
W. Vikings	1	10	3	.083	215	248	3		
W. Rams	1	10	3	.083	215	248	3		
W. Cowboys	1	10	3	.083	215	248	3		
W. Panthers	1	10	3	.083	215	248	3		
W. Redskins	10	3	2	.769	269	233	1/2		
W. Vikings	1	10	3	.083	215	248	3		
W. Rams	1	10	3						

